THE PAPER INDUSTRY

A MONTHLY EDUCATIONAL JOURNAL — FEBRUARY, 1933

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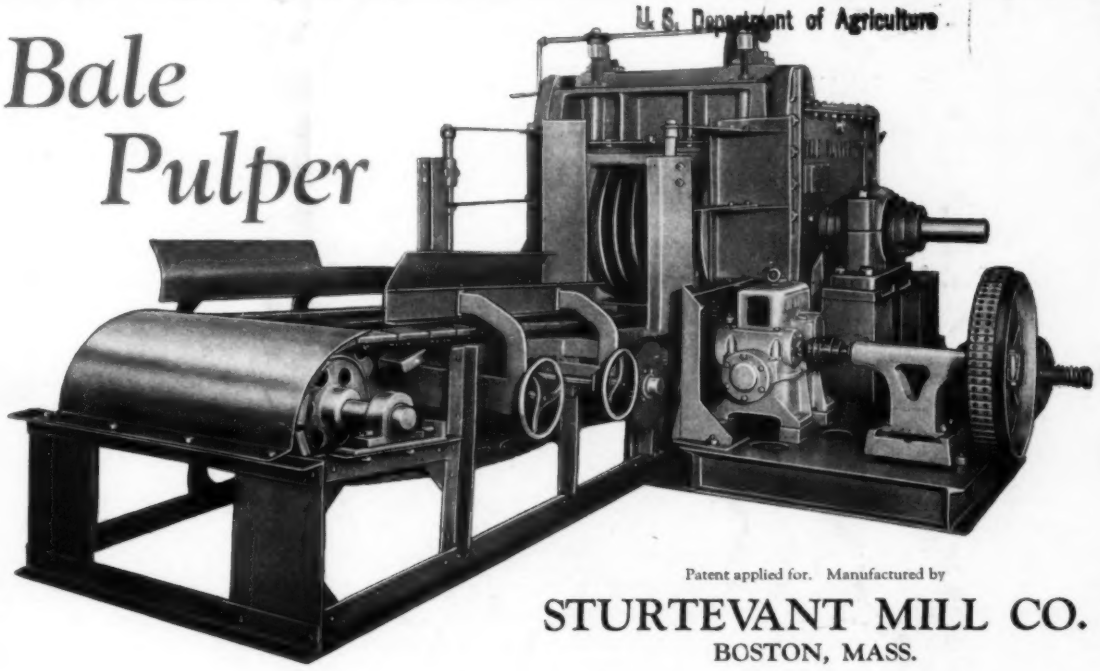

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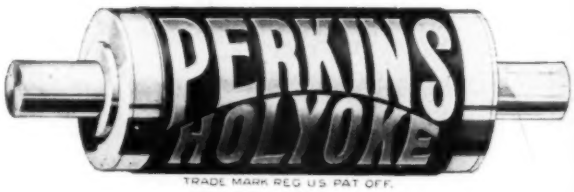

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THE PAPER INDUSTRY

FEBRUARY, 1933
Vol. XIV—No. 11

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of the Pulp and Paper Industry

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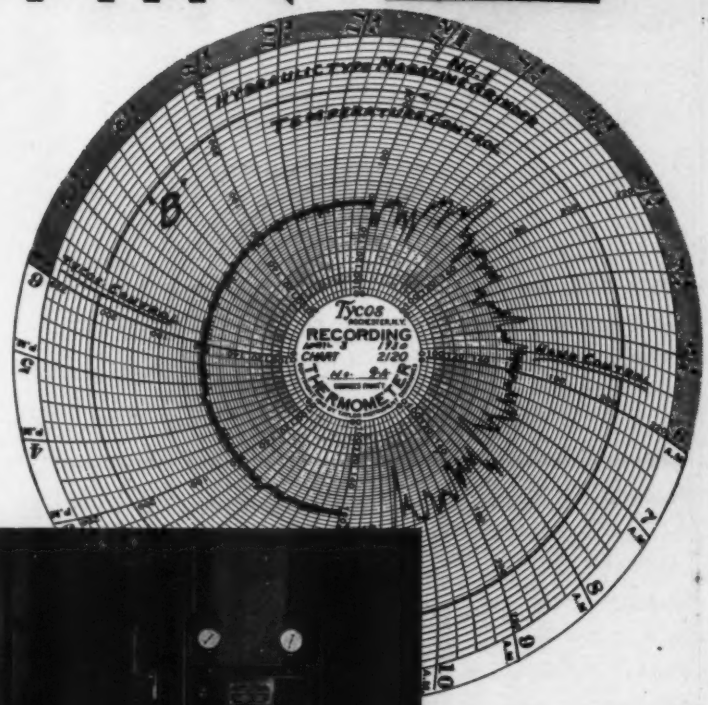

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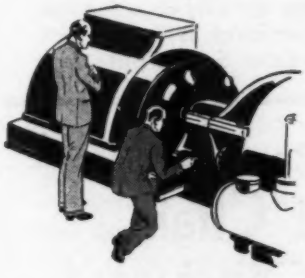

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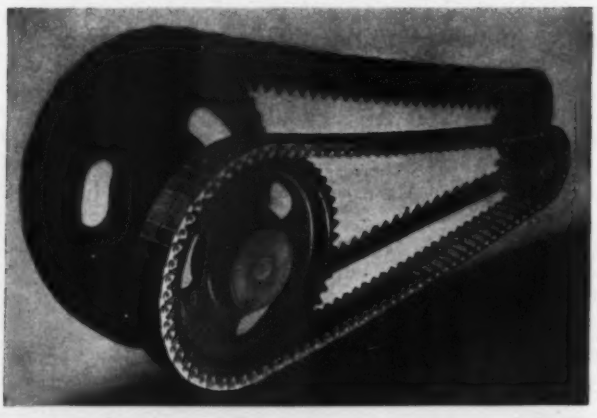

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WE ARE unquenchable optimists on the future of these United States. We believe that the groundwork for a healthy return to better, bigger business has been thoroughly laid and will make its far-reaching results apparent in 1933.

And when we say this, we are not unmindful of the fact that at this present writing, business activity is at a low ebb. However, an ebbing tide must run out to its extreme ebb, hold for a bit, and then begins the return flow. We have passed the extreme ebb; the return flow is beginning.

Deflation has been accomplished.

Hereafter, the dammed-up forces of reinflation will become increasingly evident.

On January 25 last, the Reserve Bank of Chicago held 98 cents in gold against every dollar of notes it had issued. By law it is required to reserve only 40 cents against each dollar reserve bank note issued.

The Reserve Bank for the Boston district had 97 cents in gold against every dollar note it had issued, and the New York City District Reserve Bank had 94 cents in gold against every dollar of its note issues.

Not so bad!

The Chicago Reserve Bank has issued $721,000,000 of notes with $708,000,000 of gold behind them. In other words, it is holding over $400,000,000 of dammed-up credit on which it is losing its interest earning. A still greater amount of dammed-up interest-losing credit is held by eastern banks. Why?

Principally because the financial interests of the country cannot make loans to industrial organizations because these industries are not operating on a profit-producing basis. In other words, the "profit motive" is absent.

The annual report of the National City Bank, New York City, for 1932 shows huge holdings of loanable funds. The bank's earnings were below those of 1931. The president says, in substance, that industry is in an unloanable condition, making no profit. Therefore, it was impossible to make safe and profitable loans. Hence, the decline in earnings.

Here, then, we have the reason why there is business inactivity at the moment.

However, there are manifest indices that the present stagnant situation will shortly be broken and active business will resume.

During the past month, we have witnessed a marked activity among business managements to completely reverse their attitude. It is to be accounted for somewhat along the lines of the following:

Since the first of the year Old Man Finance has gotten up on his hind legs and read the riot act to bull-headed, wilful and incompetent business management in about these words:

"Now, see here," says he, "I am all through listening to your alibis about not being able to get your business on a profit-making basis. You can't tell me any longer that your competitors won't let you raise your prices and make a profit. I'm telling your competitors just what I am telling you—'either get your prices up, make a profit, or get out.'

"I have my money invested in your bonds, stocks and bank loans for the sole purpose of making a profit on those investments. I am not interested in letting you use my money any longer in vain attempts to acquire volume tonnage at a loss. You need earnings in order to pay me my hire for my funds invested and loaned to your industry.

"Therefore, get busy. Get your operations on a profitable basis by raising prices, or get out."

And wilful Business Management will forthwith listen to his master's voice and get prices up. Incompetent Business Management will get out.

Business will be better!

Wanted—a Moses

WHAT'S the matter with the papermaking industry in this country, and what must be done to put the industry back into a position where it will be prosperous once again?

The answer to the first question is easy: overproduction and underconsumption; too many paper machines; cut-throat methods in selling, and many others.

What is the answer to the second question? The best minds in the industry have devoted much time and study to find some workable plan which would to some degree at least relieve the strain that is now affecting every man who is handling the destinies of any paper making company. If some plan could be worked out, it surely would relieve the situation.

In searching for causes of overproduction it was found that there are some 390 paper machines now running in this country (or were up to recently), with an average width of 86 inches, ranging in age from forty to sixty-five years, and with a total productive capacity of 7,560 tons of paper per day, or 2,268,000 tons annually, nearly one-fourth of the country's production. All of these machines have probably paid for themselves many times over and many of them are obsolete. Let us consider for a moment what effect the elimination of such obsolete machines would have on the industry:

The total rated capacity of paper mills in five states picked at random is as follows: Michigan, 4,532 tons per day; Massachusetts, 2,638 tons; New Hampshire, 583 tons; Pennsylvania, 1,147 tons; Vermont, 285 tons. The total rated capacity of the mills in these states, therefore, approximates 9,185 tons per day, or 7,348 tons if the mills were operating to 80 per cent capacity. The latter figure is less than the capacity of the previously mentioned 390 old machines.

How can the industry get rid of its obsolete machinery? No one has the power to tell a manufacturer that a machine is obsolete and that it should be junked; no one should have such power. But the industry, more than all else, needs a Moses to deliver it from the bondage of low prices and overproduction. If the overproduction question could be taken care of, the question of low prices would automatically take care of itself. The industry was never in such need for real leaders, men who will look beyond the present, men who can think of something greater than the immediate dollar. Not only does it need leaders, but it also needs a rank and file composed of men who will work together for the greatest good of a great industry.

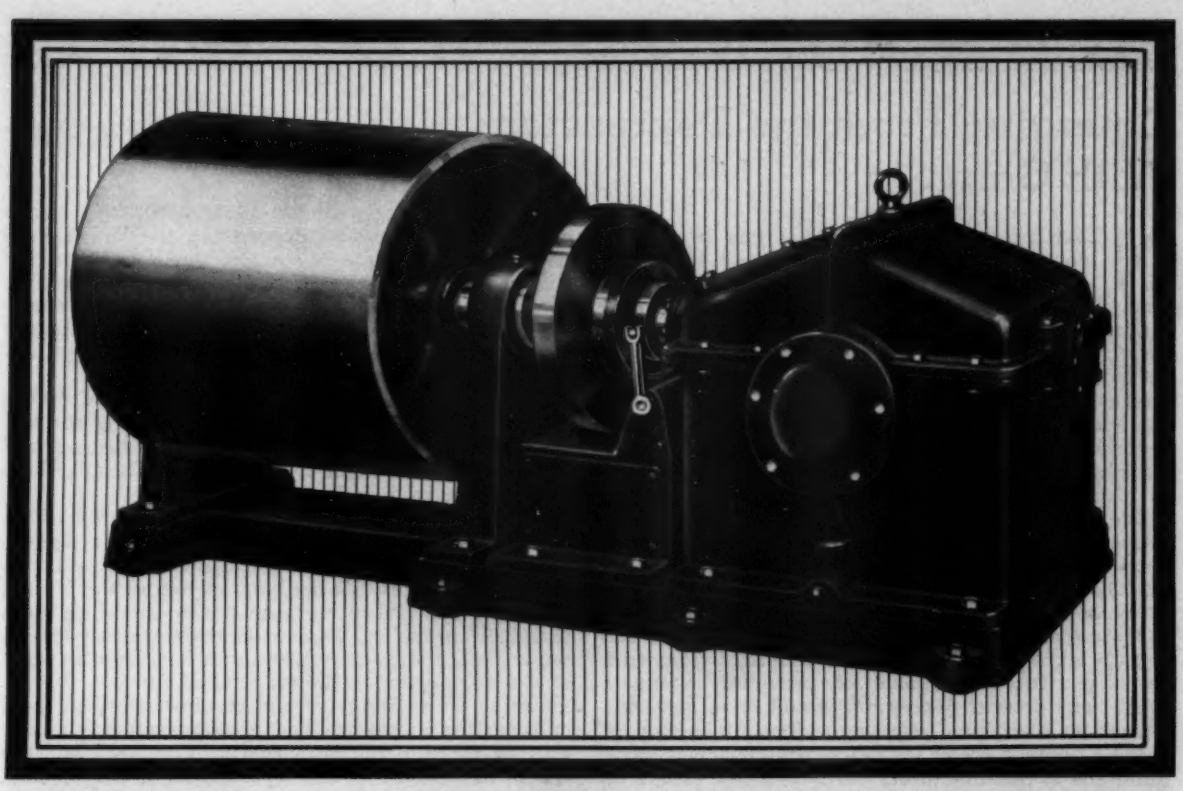
In every great national crisis in this country, when things looked darkest, a leader has come forward. This was true in the Revolutionary period with Washington, in the War of the Rebellion with Lincoln, in the World War with Wilson. There seems no reason why an emancipator for our industry cannot be found, one who will have the confidence and help of the whole industry.

In 1929, 11,090,579 tons of all grades of board and paper were made in this country. If each manufacturer would pay five cents for each ton of product manufactured in his plant, it would furnish a sum of more than $277,000 annually, based on a 50 per cent estimate of the 1929 production. This sum should be sufficient in a few years' time to purchase much of the old and worn-out machinery of the industry, which could then be scrapped.

It is impossible, of course, to get all companies to work together; but if most of the important concerns entered into such a compact, it would be possible to eliminate a good part of the obsolete equipment from the producing market and would certainly work wonders for the industry. Perhaps manufacturers of process equipment would be willing to add to such a fund in order that antiquated equipment might be destroyed and removed from the market.

Recently we were told of a case in which a mill installed four new pumps to replace four obsolete pumps. At the end of ten months this mill was able to pay for the pumps from power savings alone. This case is cited simply to illustrate that if obsolete equipment could be eliminated and new equipment installed, with any reasonable improvement in business conditions, modernized plants would be able to operate at a profit and would have ample business. The machinery plants likewise would be filled with orders, necessitating the employment of additional labor and stirring up activity in many lines of industry.

Must we touch Aladdin's lamp to find the man or group of men within our industry capable of putting such a project into effect?



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Emerging From the Depression With Gain

By WILLIAM SIBLEY

NEARLY every panic which has beset this country during the past hundred years has resulted in the institution of some deep-going change, the which has proved itself of pronounced ultimate benefit. Out of one of the previous panics came the Sherman Anti-Trust law, a statute which served to abolish monopoly and decentralize industry. And while the country now stands in serious need of its repeal, the beneficial effects of this law were much in evidence up to about ten or fifteen years ago. From the chaos of another panic, arose the establishment of insurance company control and supervision, the wisdom of which legislation has most certainly been proved during the past four years. In several other ways, costly panics have pointed the way, if indeed they have not been directly responsible for the institution of corrective legislation and beneficial changes.

More than anything else, the current period of distress is a credit panic. Had this country possessed a banking structure capable of providing adequate credit, our present depression would have been dissipated at least two years ago. The impotency of banks to extend credit for raw materials and labor to hundreds of manufacturers with bona fide orders on their books has both continued and aggravated the seriousness of our condition. Thus it is evident if we are to emerge from this depression with gain, we must take the occasion of our distress to institute much needed changes in our banking system.

The way to such a change has already been opened through the introduction of the Glass Bill. And while this measure, which provides for the extension of branch banking, is far from perfect, it is a far-reaching step in the right direction. And even though the paper industry, through its associations, cannot pass resolutions favoring its passage, the individual members of our industry should urge their respective congressmen and senators to speed the enactment of this legislation.

Up to the present time, the banking theory of our National Government, and most of the States, has been that each bank should be a local institution—locally financed and managed, drawing its funds from local depositors and using its financial resources for the development of local commercial and civic enterprises. During the development stage of the nation, this system seemed to be best suited to our requirements. It appeared to be ideal in the development of financial independence for separate communities. And under this system there had grown up, by 1920, more than thirty thousand individual banks. These unit banks were as distinctly American institutions as the odoriferous livery stables; and now quite as obsolete, since with the close of the World War this banking structure began to show serious weaknesses.

During the decade prior to 1930, more than fifty-six hundred banks closed their doors and suspended payments. More than ninety per cent of these were small unit banks located in semi-rural districts serving the small business man and farmer. During 1930, 1,345 more banks failed; during 1931, 2,298 unit banks added their names and deposits to the lengthening list of failures, while in spite of the Reconstruction Finance Corporation's efforts to bolster the weaker institutions, 1,299 more banks closed their doors during the first eleven months of 1932. And even though at a decreased rate, the suspension of appalling numbers still continues.

Against this awful and fearful picture of 10,483 bank failures in these United States during the last twelve years, involving a total deposit of just a shade under five billion dollars, England and Canada show not a single bank failure since 1915.

Could there be a more forceful demonstration of the need for and value of branch banking? As against the original thirty-odd-thousand individual banks in the United States, the banking system of the United Kingdom consists of eighteen banks operating more than 8,000 branches. In Canada, there are only twelve banks, operating about 4,000 branches. And in spite of the complication of international finance, the demoralization of industry and the instability of agriculture, this system has brought the British Isles and Canada through the most costly of all wars and the worst depression in history without a single bank failure or the loss of a penny of deposits.

Opponents to branch banking, found chiefly among the twenty thousand unit banks yet remaining in the country and such independent business enterprises as are financially interested in those banks, assert that the passage of the Glass Bill, which would give permission to the larger and stronger banks to take over the smaller and weaker ones as branches, would establish a money trust and centralize financial control into a few hands; would retard the economic development of the smaller individual communities; would endanger the Federal Reserve System, and would ruthlessly destroy the unit banks now in existence. The experience of England and Canada completely overthrows the first two objections, while a study of the Glass Bill and the foundation charter of the Federal Reserve System indicates that the establishment of branch banking in this country would have little if any effect upon the Federal System. As for the latter objection, we might better ruthlessly destroy a few unit banks now than to permit those same banks later, through failure, to ruthlessly destroy the life savings, habits of sane thrift and happiness of thousands of depositors.

The financial catastrophe of the last decade, and more particularly the last three years, has crystalized the realization for the need for a drastic change to our banking structure. Branch banking has the approval of the present administration, and can be expected to receive sympathetic consideration by the incoming administration. The Glass Bill is the first far-reaching step toward that needed improvement, and industry should mobilize its forces to secure its enactment before the less orderly and extra-legal chain banking has become an obstacle to orderly, beneficial branch banking.

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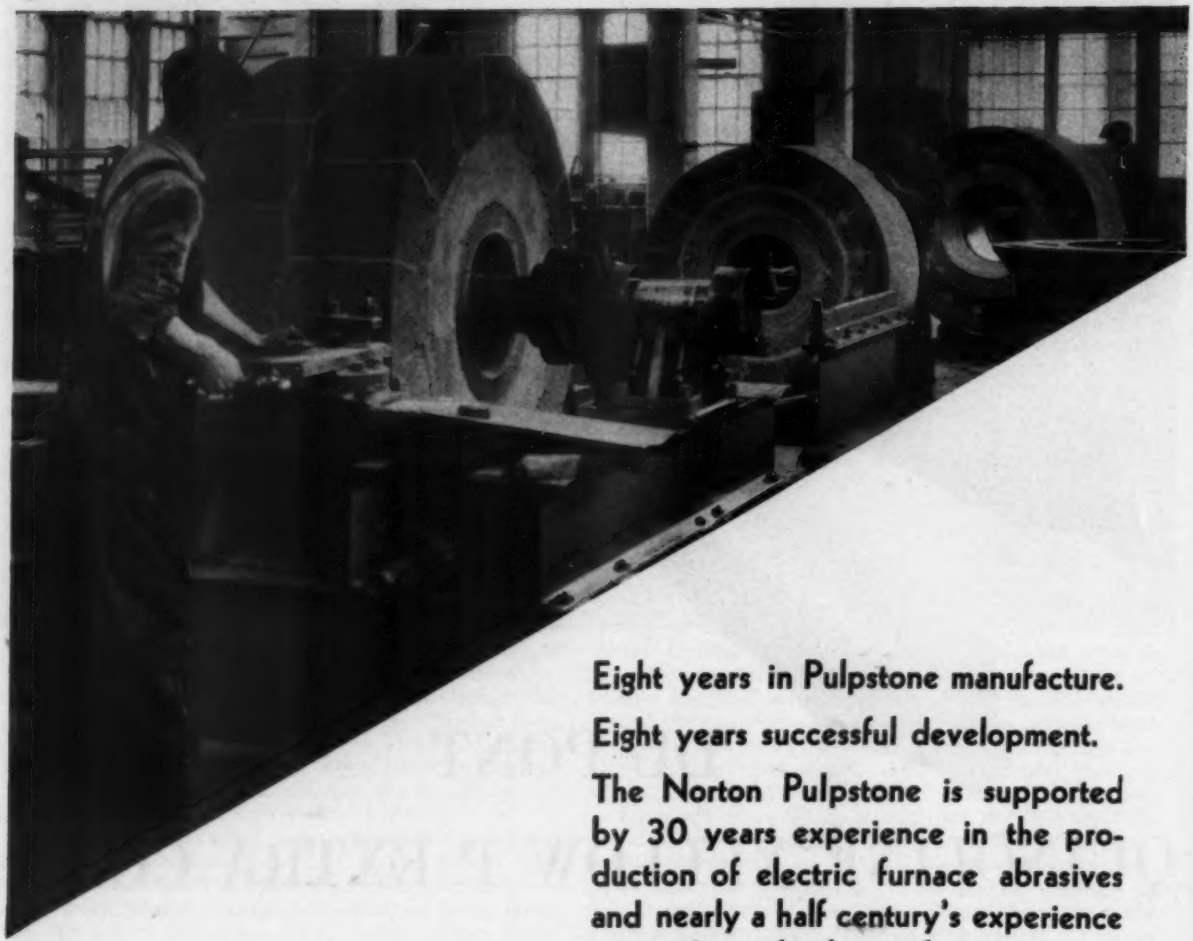

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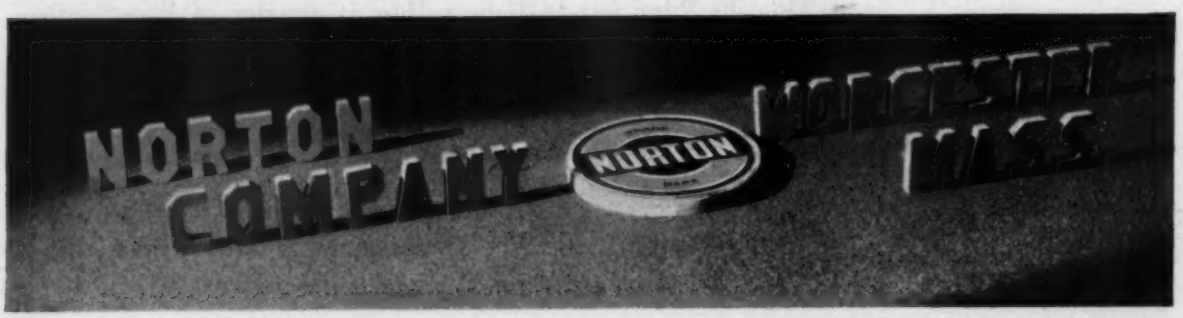

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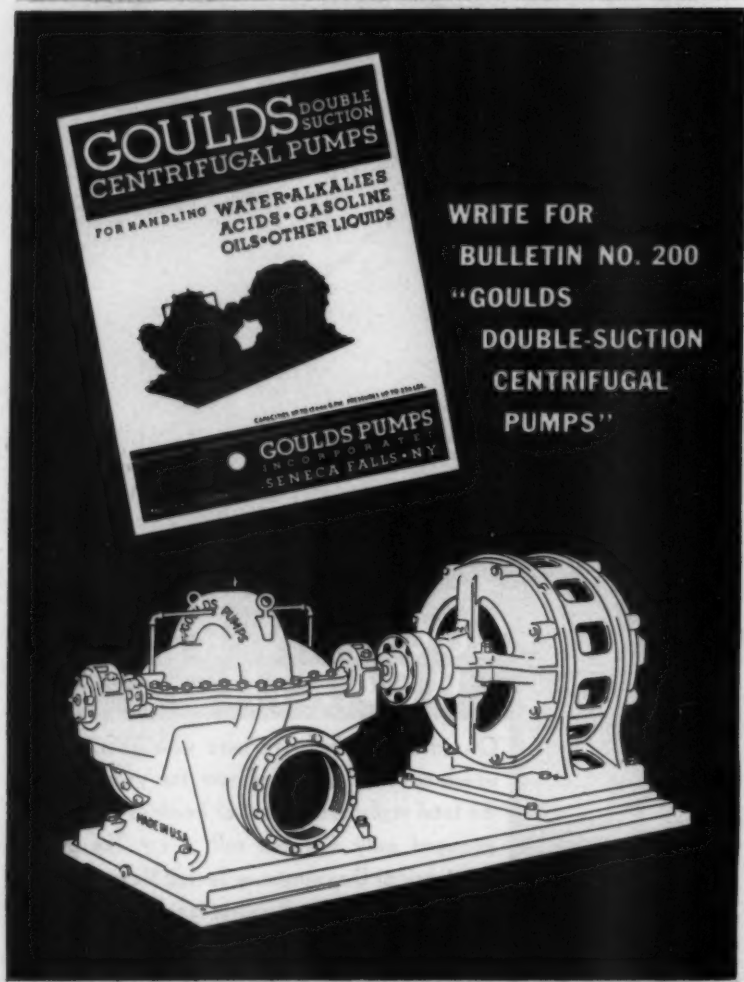
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THE PAPER INDUSTRY

A MONTHLY EDUCATIONAL JOURNAL

Watermarks in Court

Serve to Settle Litigation Over Questioned Documents

By JAY FORDYCE WOOD
Examiner of Questioned Documents

AN ITEM in the press and trade journals giving publicity to the demonstrable determination of a disputed and litigated fact by so prosaic and common a thing as a watermark in the paper upon which a fraudulent document was written attracts attention to the little-known profession of Questioned Document Examiners, men who maintain offices and laboratories exclusively for the determination of facts respecting questions which arise concerning the validity of documents.

A part of the routine of every examination of a questioned document, whether the thing suspected concerning it relates to handwriting, typewriting, alteration or what not, is the determination of the regularity of the watermark. The watermark and the records of the mill where the paper was made invariably will show a time *before* which a document written on paper bearing that watermark *could not* have been made. Usually, the ascertainment of a demonstrable fact of this character reported to a client causes his precipitate abondonment of his claim, if he is proponent of the paper; or if he is opposing the claim, his presentation of the fact to his adversary has like effect. Few cases determinable by watermark have reached the stage of trial and fewer still have been appealed to a higher court; so information or news concerning such cases is generally local.

The course of the very recent case of Morrison v. Majestic Theatre Corporation, et al, noted in the November, 1932 issue of THE PAPER INDUSTRY is typical. Claim was made by Morrison against the New Haven Board of Trade, et al, for $1,000,000 under a lease purporting to have been executed April 13, 1927, charging conspiracy in restraint of trade. The case was tried in the United States Court at Hartford continuously for four weeks presenting the claimant's case. Upon the conclusion of the complainant's case, the defendants called as their first witness George W. Mosher of the White & Wyckoff Manufacturing Company, who showed that the watermark of the paper used in the pretended lease was not designed until 1929; and followed his testimony with that of George S. Witham of the Parker-Young Paper Company of Lincoln, N. H., who testified that his company had acquired the patent or copyright in the watermark from White & Wyckoff Manufacturing Company and had not manufactured paper such as the lease was written upon until April, 1930. Judgment was at once entered for the defendants.

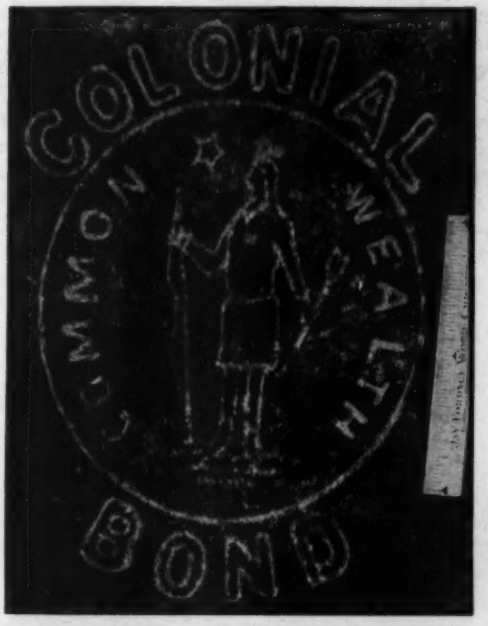

Figure 1

Paper bearing the "Colonial Bond" watermark (Fig. 1) was used two or three years since in an im-

portant pretended contract in the case of Gamble v. Burt, the preliminary legal questions of which were decided in 227 Mich. 31; N. W. The case was presented to Albert S. Osborn, dean of questioned document examiners, of New York City, to determine the validity, or otherwise, of the contract which bore date May 15, 1880. The case was of great importance and involved some millions of dollars. Mr. Osborn was assisted by Elbridge W. Stein, of New York, and the author. Examination disclosed that the paper was made by the Bradner-Smith Paper Company, of Chicago, and investigations revealed that the design of the watermark had been made by Mr. Arnold, at that time an officer of that company. The original dandy-roll and bill for its making were produced in open court by the papermakers who had directed the first run of the mill carrying that watermark during the year 1906. Claimant's attorneys abondoned their claim and withdrew their appearance before the conclusion of the direct examination concerning the matter. It also developed at the trial that not only was the paper manufactured years after the date of the document, but it was shown, and the decree of court found, that the typewriter which had written the contract in question had not been patented until 1905, and the individual machine upon which the contract was written was not made until after November, 1911. It also appeared that the Hotchkiss fasteners with which the contract was fastened had not been patented for many years after the date of the contract. The claimant, Gamble, was thereafter indicted and criminally prosecuted for his fraud, the author later testifying at the prosecution. He was convicted but died during the pendency of an appeal to the upper court.

Another most interesting recent case is that reported in Belcher v. Booth, 164 La. 514; 114 S. E. 116. The claimant had selected BERKSHIRE BOND, a paper with an appropriate watermark so far as the date was concerned. The record disclosed that Ed Sudlind died in March, 1902 and his estate was distributed as an intestate. Twenty-one years later his alleged will, dated in *January, 1902,* was, as is usual in such cases, "found in an old trunk," and was used as the basis of an attempt by the claimant to recover the estate.

The sheet of paper selected for making the will showed an accident to the dandy-roll; the letter "B" of BERKSHIRE had dropped off and was missing, the watermark reading ERKSHIRE BOND U S A.

Investigation by Bert C. Farrar, official examiner of documents for the United States Government, unearthed the facts in respect to the matter. The trial judge in deciding the case said:

"The most decisive testimony in the whole case is given by Mr. J. E. Colton, of Pittsfield, Berkshire County, Mass. Mr. Colton is the manager of the typewriter paper department of Eaton, Crane & Pike Company, which concern is one of the largest, oldest, and most reputable manufacturers of paper in the United States. Mr. Colton has been with this concern since 1890. In giving the testimony of this witness, we can disregard entirely what he says as an expert and merely give what he states as facts within his personal knowledge.

"Mr. Colton testified that he himself prepared the sketch from which the type was made for the watermark of BERKSHIRE BOND U S A; that this sketch was made on December 19, 1905; and that paper bearing the above watermark was first placed on the market in the spring of 1906; that between December 12, 1907, and October 11, 1909 the letter "B" in the word BERKSHIRE was dropped from the dandy roll, and likewise from the watermark on five different lots of paper, and these lots, therefore, went on the market watermarked ERKSHIRE BOND."

The Supreme Court in affirming the decision of the lower court stated:

"In this case it is shown beyond a reasonable doubt that the purported will is written upon paper that was not made and marketed until five years after the death of the alleged testator, and therefore there is no escape from the conclusion that the document purporting to be the will of the deceased is a forgery."

Figure 2 represents a watermark which appeared in a paper upon which was written a will, dated October

Figure 2

3, 1918, purported to be that of the late Edwin D. Jennings, of Chicago. The illustration, which was cut from a transmitted light photograph of the will, shows that the monogram was cut through, the lower half of it appearing at the top of the sheet, while the top portion appeared at the bottom of the sheet upon which the will was written.

Investigation concerning the watermark developed that the paper was made by the Whiting-Plover Paper Company of Stevens Point, Wis.; that the company had used the watermark ARTESIAN BOND, as shown in (a) of Figure 3, from 1914 until April 30, 1919, at which date the monogram shown in (b) of Figure 3 was added. This watermark was used until May 19, 1920, when "Made in U S A" as shown in (c) was added, and that watermark then used until February 19, 1921, when, the impression "Made in U S A" being unsatisfactory, it was changed as appears in (d) which, it will be noted, corresponds to the form appearing on the questioned will, Figure 2, dated October 3, 1918. At the hearing, E. A. Oberweiser, President and Treasurer of the Whiting-Plover Paper Company was produced as a witness and testified to the facts set forth above and "that by watermarks in the paper on which the purported will was written he was able to determine that the paper was not manufactured prior to the year 1920. The Probate Court thereupon denied probate to the purported will." Koester v. Jennings, 334 Ill. 107; 165 N. E. 650.) The claimant Koester, and his witnesses in the fraud, were indicted. Koester

died while waiting trial and his witnesses pleaded guilty, without trial, to conspiracy to defraud the estate.

Within the past year the author was called upon to examine a purported will of Bartholomew D. Brooks, deceased, at Indianapolis, Indiana. After an acrimonious trial, a jury declared the will to be a forgery, and almost immediately the claimant presented a *second* will purporting to be dated subsequent to an admittedly genuine will of Mr. Brooks, under which distribution of the estate was to be made after the defeat of the spurious will first presented. The second will presented by the claimant, dated September 16, 1924 carried the watermark shown in Figure 4.

Examination concerning the watermark in this case is typical of the completeness and convincingness of proof of this character in meeting a spurious claim.

As above stated, the will was dated September 16, 1924. Investigation showed that: The paper bearing this watermark was made specially for the J. G. Blair Company of Huntingdon, Pa. by the Howard Paper Company of Urbana, Ohio; that the Howard Company ordered the rubber markers or forms for the paper on

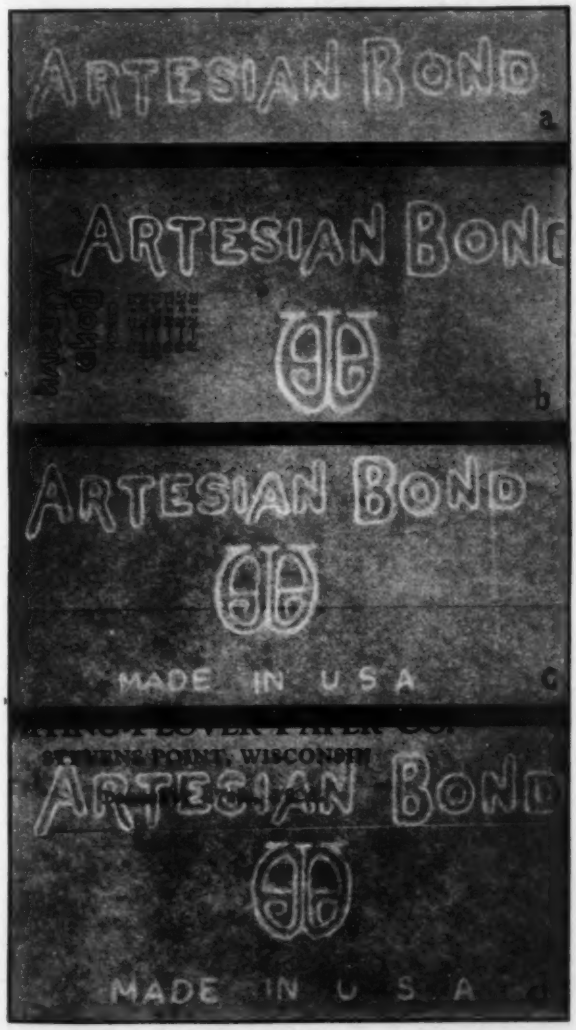

Figure 3

September 25, 1925 from the Cincinnati Rubber Manufacturing Company, which ordered the metal die therefor from Gregg G. Wright & Sons of Cincinnati on September 26, 1925; that the die was completed October 1, and the rubber markers delivered to the Howard

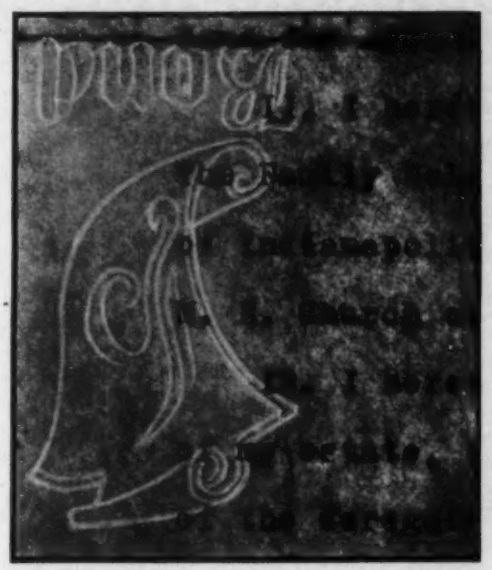

Figure 4

Company on October 16, 1925; and that the first shipment of paper to the Blair Company was on November 2, 1925, more than a year after the date of the questioned will. The case was dismissed and the claimant desisted from further attempts to plunder the estate.

While methods of the scientific document examiner for meeting all character of fraudulent and spurious papers include the use of light rays beyond the visible spectrum—ultra-violet and infra-red; chemical aid to secure the restoration of "bleached" or eradicated writing; and technical photography with the aid of sensitive emulsions and filters, there is no evidence that will cause the proponent of a spurious document of any kind to get into reverse and quit like that furnished by a post-dated watermark.

❖ ❖ ❖

Ramie Fiber

The use of ramie fiber for paper making purposes has come into the limelight through publicity accorded it in recent articles on the subject of technocracy. It is a fiber that is obtained by the decortication and degumming of several varieties of the plant of the genus Boehmeria. This fiber, said to be nearly three times stronger than Russian hemp, after digestion or degumming in water is practically pure cellulose. The fiber length of Boehmeria tenacissima varies from ¼ inch to 2 inches, and averages 1 inch, while its breadth ranges from .010 inch to .020 inch and averages .0215.[1].

Among the uses cited in the literature for this fiber are uses in the making of tapestry, tablecloths, mats, sails, gas mantle fabrics, rope and paper.

[1]Paper Testing Methods, T. A. P. P. I., 1922.

Technical Control in the Sulphate Mill

A practical presentation emphasizing critical points in production processes and suggesting means of control

By R. H. STEVENS

DURING the period of 1925 to 1930, the world production of sulphate pulp was doubled—an astonishingly accelerated rate of growth. In another decade, the production of sulphate will exceed that of unbleached sulphite if the present rates of increase should continue respectively for each. Conceivably, the production of sulphate pulp may be accelerated even more than has been suggested by Charles W. Boyce[1] as newer developments in the technology of bleaching enable this class of pulp to enter fields hitherto supplied entirely by sulphite. This rapidly growing importance of the sulphate pulping process emphasizes the need for close technical control. Already, increasingly keen competition is forcing the mills to guard closely against waste. Developments of new uses demanding special qualities not now required will involve still closer control in order to meet these exacting requirements.

Logically, technical control should begin with the raw material. Mills located near the woods, as are most of the Southern mills, can control the character of their wood whether from their own cuttings or that hauled in by farmers. Those bringing wood from a distance may have more trouble in guarding against undesired species or types. Not enough work has been done, or what has been done has not yet been sufficiently popularized, along the line of grading pulpwood according to density, freedom from defects, etc. Lumber grading rules are well standardized, but pulpwood grading has not kept pace. At least not in the South where more than half the sulphate pulp production of this country is now located. When wider utilization of the more resinous types with by-product recovery shall come into vogue, determination of resin content may assume considerable importance. Similarly, a more extensive use of hardwoods will involve rules for grading these according to standard specifications.

Though often neglected, technical control of wood room operations is very important. If the bark is conveyed to the boilers, a continuous weighing scale and automatic sampler would be useful in checking the amount of this refuse. This would serve as a check on pulpwood grading. Wood with too much bark should be classed in a lower grade. A similar record of the amount of fines would indicate condition of chippers, and screen analyses at regular intervals, of a grab sample of chips going to the digesters, will show up the general efficiency of the wood preparing operations.

The digester room is where one would naturally expect to find close technical control. In many mills, however, it is the one department in which this is least adequate. For real cooking control, *everything* that goes into the digester should be accurately proportioned. This seems so obvious to anyone with a scientific mind that it is difficult to understand why it is so universally disregarded. The quantity of chemicals used is regularly measured with great care, but the wood, which may cost even more than the chemicals, is charged entirely by guess. And the pulp maker wonders why it is so hard to get two cooks alike! Suitable automatic weighing devices are in everyday use for proportioning materials not very dissimilar to wood chips in other chemical engineering industries, but the pulp maker has not yet availed himself of them.

Weighing in the wood, of course, involves determining the moisture content and this must be done rapidly in order not to retard production. In some mills, a small measured volume of the chips is weighed and this weight referred to a table worked out according to the digester volume and an average dry weight for the volume taken. The figures in the table are often based on the assumption that there is always the same amount of dry wood per unit volume and any variation in the weight is due to moisture. Actually this assumption is incorrect. Green chips pack together more readily than dry. This results in charging a greater quantity of wood, oven dry basis, when using green wood than with seasoned wood even though the same filling method be employed. The only really accurate way to control the digester charge is by weighing in the chips and making a rapid moisture test. This can be done by drying in a current of heated air; for example, in a Spencer oven, after grinding the chip sample very fine. For the latter purpose, the Wiley mill serves admirably.[2]

For purposes of mill control, the white liquor may be conveniently analyzed by a quick titration method using only one standard solution, normal hydrochloric acid, and one burette with two indicators, phenolphthalein and methyl orange. The method is as follows:

A—5.0 ml. of the liquor is titrated to phenolphthalein change-point.

B—Titration A is continued to methyl orange change-point.

C—50.0 ml. of the liquor in a 250 ml. volumetric flask is treated with an excess of barium chloride, shaken well, filled to the mark with clean water, and well mixed. After settling 25.0 ml. of the clear supernatant liquid is titrated to methyl orange change-point.

Calculations: (Figures used are illustrative only.)

First Step:

(1)	$B = NaOH + Na_2S + Na_2CO_3$	= 20.5 ml. HCl
(2)	$A = NaOH + \frac{1}{2}Na_2S + \frac{1}{2}Na_2CO_3$	= 17.0 " "
(3)	$B-A = \frac{1}{2}Na_2S + \frac{1}{2}Na_2CO_3$	= 3.5 " "
(4)	$2(B-A) = Na_2S + Na_2CO_3$	= 7.0 " "

[1]Chas. W. Boyce, *Pulpwood*, April 1931.

[2]C. R. Blomstedt, *Paper Trade Journal*, 92:18, T. A. P. P. I., Sec. p. 254 (1931).

Second Step:

(1)	$B = NaOH +$	$Na_2S +$	$Na_2CO_3 = 20.5$	ml.	HCl
(5)	$C = NaOH +$	Na_2S	$= 18.0$	"	"
(6)	$B-C =$		$Na_2CO_3 = 2.5$	"	"

Third Step:

(4)	$2(B-A) =$	$Na_2S +$	$Na_2CO_3 = 7.0$	"	"
(6)	$B-C =$		$Na_2CO_3 = 2.5$	"	"
(7)	$2(B-A)-(B-C) =$	Na_2S	$= 4.5$	"	"

Fourth Step:

(1)	$B = NaOH +$	$Na_2S +$	$Na_2CO_3 = 20.5$	"	"
(4)	$2(B-A) =$	$Na_2S +$	$Na_2CO_3 = 7.0$	"	"
(8)	$B-2(B-A) = NaOH$		$= 13.5$	"	"

Applying the analytical factors:

$NaOH = 13.5 \begin{cases} \times\ 8.0 = 108 \text{ g./l.} \\ \times\ 6.2 = 83.7 \text{ g./l. as } Na_2O \end{cases}$

$Na_2S = 4.5 \begin{cases} \times\ 7.8 = 35.1 \text{ g./l.} \\ \times\ 6.2 = 27.9 \text{ g./l. as } Na_2O \end{cases}$

$Na_2CO_3 = 2.5 \begin{cases} \times 10.6 = 26.5 \text{ g./l.} \\ \times\ 6.2 = 15.4 \text{ g./l. as } Na_2O \end{cases}$

The sulphate would, of course, have to be determined gravimetrically. For illustration, assume it was found to be 8.7 grams per liter, equivalent to 3.8 grams of Na_2O. Then:

The Total Alkali is

$(20.5 \times 6.2) + 3.8 = 130.9$ grams per liter

The Active Alkali is

$18.0 \times 6.2 = 111.6$ grams per liter

The Activity is

$$100 \times \frac{111.6}{130.9} = 85.3\%$$

The Causticity is

$$100 \times \frac{83.7}{83.7 + 15.4} = 84.4\% \quad \text{Or } 100 \times \frac{13.5}{13.5 + 2.5}$$

The Sulphidity is

$$100 \times \frac{27.9}{27.9 + 83.7} = 25.0\% \quad \text{Or } 100 \times \frac{13.5}{18.0}$$

Some chemists prepare the standard solution of such concentration that the burette readings give pounds Na_2O per cubic foot or pounds saltcake per gallon, but the author has always preferred the metric system with conversion factors.

Tables giving the number of inches of liquor in the measuring tank required for each cubic centimeter used in the titration in order to furnish a given amount of active alkali guide the cook in measuring out the digester charge. The amount of active alkali in the black liquor is more difficult to determine. Usually some rule of thumb is followed, as, for example, that sixteen inches of black liquor are equivalent to one of white. The magnitude of error in such an assumption is certainly insignificant in comparison with that involved in guessing the amount of wood, but an easy method of determining the active alkali in black liquor is very much needed. The really accurate methods that have been proposed for scientific research are not suitable for control work.[3]

Although it is standard practice to prepare the white liquor at sufficient concentration to allow considerable dilution with black liquor in charging the digester, the value of this practice has been questioned. In favor of using more dilute white liquor is the greater ease of settling the lime sludge in such liquors. On the other hand, black liquor always contains some active alkali which can be utilized in this way without passing through the recovery furnace. Also re-use of black liquor increases the fuel value of the black ash. There may also be some favorable influence on the cook by reason of the presence of products of the reaction at the beginning. Information as to this is lacking though the belief is well-nigh universal that the addition of black liquor exerts a beneficial influence greater than could be expected from the amount of active alkali it is known to contain. The idea has prevailed in some quarters that addition of black liquor is a detriment to bleachability due to staining the fiber with some dye formed in such liquor upon exposure to air before use. This cannot be true, however, for bleachable pulp is being made every day with black liquor included in the digester charge.

In determining the optimum digester charge, it is necessary to govern both the total quantity of active alkali in proportion to the amount of wood and also its concentration in the total amount of liquid, of which the moisture in the wood is a part. The influence of the latter is sometimes overlooked. By suitably adjusting the quantity and concentration it is possible to alter the character of the pulp from a given wood within fairly wide limits.

The role of the sulphide in the cooking reaction is still obscure though it appears to act as a demethylating agent, possibly by reaction with carbonyl groups of the lignin. Certainly the presence of methyl mercaptan among the reaction products supports this view. At all events the presence of even a relatively small amount of sulphide facilitates the pulping action and improves the quality of the product as compared with the straight soda cook. Many have been the disputes among pulp mill men as to the optimum sulphidity. It has been demonstrated, however, that even the lowest sulphidity that the most efficiently managed mills have been able to maintain is not too low for good pulp production. The author knows of one mill that has maintained good pulp quality with only 240 lb. of saltcake per ton of pulp. On the other hand, amounts in excess of 500 lb. per ton also have given good results.

There was formerly some confusion as to the proper definition of the term *sulphidity*. Under the influence of T. A. P. P. I., it has come to be almost universally expressed as the per cent of active alkali present as sulphide. Similarly, *causticity*, which formerly meant one thing in one mill and something else in another, is now officially defined as the per cent of carbonate converted to caustic, just as in the straight soda process. *Activity* refers to the per cent of the total alkali that is active. The true significance of these terms will become more apparent in discussing the control of the caustic room.

Once the charge is in the digester, the practice in most kraft mills is to get up to cooking pressure as rapidly as possible, cook hard for a minimum time and blow quickly in order to get maximum production. For uniformity of pulp quality, reliance is placed on the blending of the product of several cooks. For higher grade pulps, however, uniform cooking is essential.

[3]Cf. esp. Kullgren Karl, *Ingeniors Vetenskaps Akadamien*, Handlingar No. 65. (Title translated, "On the Changes in Alkalinity and the Effect of the Sodium Sulphide in the Alkaline Pulping Process.")

Next after accurate proportioning of the digester charge, the most important consideration is thorough penetration of the liquor into the chips before cooking begins. It is unfortunate that cooking of sulphate pulp has been regarded as a foolproof operation. That it is not entirely so the author learned to his grief one morning early in his pulp making experience when the president of the mill company informed him that a raw cook for which he was responsible meant a loss equal to half his yearly salary. That adequate time can be devoted to securing liquor penetration without lengthening the cooking cycle seems not to be realized generally. Experimental cooks in a semi-commercial digester have shown that the time on pressure can be even entirely eliminated, the cooking being done during a lengthened temperature-rise period. And in one mill where the total cooking time was three hours and twenty minutes, the time on pressure was cut to thirty minutes in order to allow for an adequate penetration period. The result was greater uniformity of pulp quality with less screenings.

Elimination of the human element in maintaining the desired cooking schedule by means of automatic time-temperature controls would make for greater uniformity of product. Such automatic control instruments are in use as a matter of course in other industries; for example, in vulcanizing rubber goods. They can be made to operate both steam inlet and gas-off valves, as well as to stop and start the liquor circulating pump, all according to a pre-determined schedule such as shown in Figure 1.

Direct and indirect cooking each have their advocates as also has the use of tumbling digesters. Each system has its merits and disadvantages. The author once saw in a research laboratory a steam jacketed autoclave equipped for synchronized cooking with direct steam. The rates of steam inlet and the gas-off were regulated

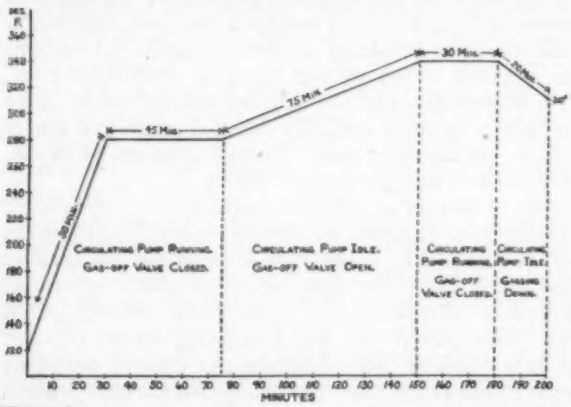

Figure 1

to maintain the original alkali concentration throughout the cook. If this could be duplicated in mill scale equipment at reasonable cost it would be a splendid improvement. With such a system it might be possible to trace the progress of the cooking reaction electrometrically.

In many mills, as soon as a digester is blown, a sample of the pulp is washed, screened and subjected to a simple control test such as the permanganate number, chlorine number, etc. Such tests have some value, no doubt, but there is room for considerable improvement both in the details of the methods and in the interpretation of the results. This will doubtless be one of the by-products of the work now under way by the T. A. P. P. I. Raw Materials Division in this country and by the European Strength Testing Committee abroad on the development of standard specifications for chemical wood pulps.

Pulp washing control in most mills is a matter of manual hydrometry. These rough and ready methods have served admirably in the hands of conscientious workmen, but a foolproof automatic recording instrument would be a great improvement. In one mill, the author saw specific gravity recorders in use. He was told they worked very well on weak liquor, but gummed up badly with heavy liquor. This tendency of sulphate mill black liquors from resinous woods to gum up everything with which they come in contact is the great obstacle to the use of automatic appliances. In some mills, a competent individual is detailed to look after all delicate instruments throughout the plant. Under his supervision, and with the backing of a sympathetic superintendent, the operators can be made to flush out these instruments with hot water as often as needed. This is all that should be required for properly designed equipment.

The remainder of Mr. Stevens' article will be published in a subsequent issue.

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Lithographic Papers Dimension Changes

PRECISE laboratory measurements being made at the Bureau of Standards of changes in dimensions of lithographic papers with changes in atmospheric humidity show that the extent of these changes has a definite relation to the way in which the various papers were made. The surface coating of lithographic papers with starch or mineral matter, such as clay, was found to increase the dimension changes with the greater effect shown by the mineral coating.

Another paper making variable that was found to influence dimension changes was the degree of beating. Papers made with more drastic beating of the fibers were found to expand and contract more than papers prepared from less drastically beaten stock. Such results were not unexpected, since each of the conditions mentioned tend to promote compactness, and compact papers usually expand and contract to a greater degree with change in moisture content than less compact papers.

The results of the laboratory measurements of the effect of beating treatment, however, are considered particularly significant because of their correlation with the response of the same papers to offset printing. In printing the papers on a commercial offset press, the paper made with least drastic beating and jordaning gave best register of successive prints, and poorest register was obtained on paper made with the more drastic treatment. This correlation of results further emphasizes the desirability of manufacturing papers for lithography with the minimum of beating essential for satisfactory strength and printing finish.

Testing Centrifugal Pumps

By O. K. GRAEF
Consulting Mechanical Engineer

THE AVERAGE plant engineer, at least once in his active career in a pulp or paper mill, finds that in self defense he must run a test on a centrifugal pump. Possibly the purchasing department has bought a pump on a price basis, or perhaps the superintendant insists on the use of an old pump in an inappropriate location. In any case, an actual plant test of the pump provides the engineer with the last word in the controversy revolving about "why it won't work." Newly purchased pumps should be subjected to a plant test as a check on the guarantees of the pump manufacturer, and in many cases a saving may be made in the power bills by the insistence that a pump fulfill the efficiency guarantee under which it was sold. The last word in a controversy is usually had by the engineer who is prepared to back up his statements with a chart drawn from actual plant conditions.

Because the average plant engineer or master mechanic is usually several years out of school and his theory is more or less hazy, a method for testing centrifugal pumps on water or stock is here presented in the hope that it will be found useful.

Pump Variables and Methods of Measuring

The complete test of a centrifugal pump is made up of measurements of four variables: Capacity, *(Q)*; Head, *(H)*; Speed, *(N)*; and Power, *(P)*. Before taking up the subject of how these measurements are made, it might be well to first state the relations between these variables; i. e., the capacity varies approximately as the speed; the head varies approximately as the square of the speed; and the power varies approximately as the cube of the speed. Thus the variation of any one of the factors has an effect of varying magnitude on each of the other factors.

Capacity *(Q)* is, of course, the amount of water delivered by the pump, and for

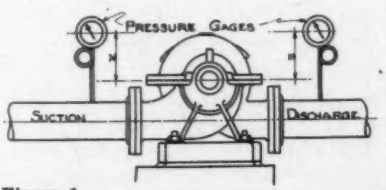


Figure 1

the purposes of this discussion will be given in gallons per minute *(GPM)*. Because many general service pumps and most stock pumps either draw from, or deliver to, chests and tanks, these may be calibrated in gallons and direct readings of *Q* taken from the liquid level in the tank. Where tanks are not available, a weir is probably the next best bet, and may be constructed from the data given in any hydraulic handbook.

If a weir is impracticable, the velocity of flow in the lines may be found by use of a pitometer: and with the velocity of flow and area of the pipe known, the calculation of the *GPM* is only a matter of arithmetic. Another method involves the use of an orifice of known coefficient of discharge. However, in the average mill test, which usually involves pumps of rather small capacities, direct measurements of *Q* are probably the easiest and best, and the measurement of the fluid either into, or out of, a tank should be used if possible.

Dynamic Suction Head is the difference between the static head and the sum of the entrance losses, friction losses and the velocity head.

Dynamic Suction Lift is the sum of the static head, entrance losses, friction losses and velocity head.

Dynamic Discharge Head is the sum of the static head, entrance losses, friction losses and velocity head.

Where Suction Lift exists, the Total Dynamic Head is the sum of the Dynamic Suction Lift and the Dynamic Suction Head, but where Suction Head exists, the Total Dynamic Head is the difference between the Dynamic Discharge Head and the Dynamic Suction Head. In other words, the Total Dynamic Head *(H)* is the algebraic sum of the suction and discharge heads.

When positive suction head exists, total head may be measured by the use of pressure gauges located as close to the suction and discharge nozzles of the pump as possible. These gauges must be located in such a manner that their center-lines coincide with the center-line of the pump. If this is not possible then the elevations of the gauges referred to the center-line of the pump must be taken, and this dimension used to correct the head indicated by the off-center gauge or gauges. In the case shown in Figure 1, x and z in feet, would be added to the feet head indicated by the gauges.

When negative suction head, or suction lift, is present, the reading on the suction side may be made with a vacuum gauge or with a mercury column. The head indicated being added to the head shown on the pressure gauge on the discharge side as before stated. If the vacuum gauge is attached in such a manner that the center-line of the gauge varies from the center-line of the pump, the vertical distance above or below the pump center-line in feet, must be added or subtracted, as the case may be, to correct the feet head reading of the gauge.

If a mercury column is used to indicate suction lift, the reading is taken at the top of the right hand mercury column, Figure 2. Letting S represent the suction gauge reading in inches of mercury; y the distance in feet between the top of the mercury in the right hand column and the center-line of the gauge (this is disregarded when two gauges are used, as the gauges are referred to the center-line of the pump); H is the Total Dynamic Head in feet of water; P is the pressure in pounds per square inch; h' is the velocity head $(V^2/2g)$

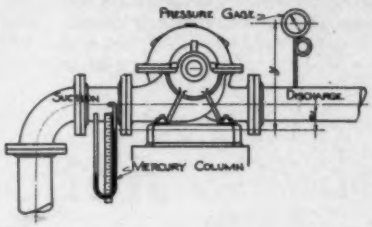


Figure 2

in the discharge line; h'' is the velocity head in the suction line; and w is the head in feet of water on the mercury column. In this formula use $+$ for S when reading is a vacuum, and $-$ for S when a pressure.

$$H = 2.31\ P \pm 1.132\ S + \left(\frac{h'^2 \quad h''^2}{2g}\right) + w$$

If a gauge is used instead of a mercury column, disregard w in the formula. If the suction and discharge pipes are equal in size, the term $\left(\frac{h'^2 \quad h''^2}{2g}\right)$ cancels, because h' and h'' are then equal. If a vacuum gauge is used, the term for a mercury column remains the same, as these gauges are usually calibrated in inches of mercury. If a pressure gauge is used to measure Suction Head on the suction side, calibrated in pounds per square inch, the second term becomes $-2.31\ P'$ instead of $\pm 1.132\ S$, where P' is the reading in pounds per square inch of the pressure gauge on the suction line.

In cases where the total head is low, or the suction head is high, the velocity head is an important factor and must be considered in the measurement of Total Dynamic Head. If a mercury column is used for the measurement of suction lift, the column will show the static suction lift, and also the velocity head of the flowing liquid, the entrance head and the friction head. If a vacuum gauge is used, it will not indicate the velocity head, but only the static suction lift, entrance head and friction head. Therefore the velocity head must be calculated and added to the gauge reading. The formula is $h' = V^2/2g$, where h' is the velocity head, V is the velocity of flow in feet per second, and g is the acceleration due to gravity; i. e., 32.16 feet per second.

When gauges are attached to suction and discharge lines, the gauge connection pipes must be filled with water before attaching gauges. If the pump is

handling stock, the gauges must be provided with siphons to prevent stock from entering the gauges.

To convert the pressure gauge readings, which are usually in pounds per square inch, to feet head, multiply the reading of the gauge by 2.31. To convert feet head to pressure in pounds per square inch, multiply by 0.434. To convert vacuum gauge readings which are usually given in inches of mercury, to feet head, multiply by 1.132.

The factor of speed *(N)* should present no difficulty, for the speed of the unit may be readily measured with a tachometer or revolution counter.

The Power *(P)* readings are important and should be carefully made. The

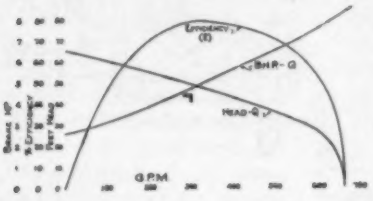


Figure 3

readings should be made from a polyphase wattmeter, and individual voltage and ampereage readings should be made in addition. If a polyphase wattmeter is not available, the voltage and ampereage readings may be used in conjunction with the following formula:

$$\text{H. P. Input} = \frac{1.73 \times V \times I \times PF \times 1.34}{1000} = 0.00232\ V\ I\ PF$$

Where V is the indicated voltage; I is the indicated ampereage; and PF is the power factor. This formula should also be used to check the polyphase wattmeter readings, if one is used.

The brake horsepower, *(BHP)* is equal to the H. P. Input multiplied by the efficiency *(E')* of the motor expressed decimally. For the Power Factor *(PF)*, motor efficiency relation, see Figure 3. This chart is based on an average of 25 and 60 cycle motors, 10 to 60 hp. and 750 to 1,800 *RPM*.

The theoretical or Water Horsepower *(WHP)* is calculated from, $WHP = \frac{WH}{33000}$ or $\frac{GPM\ H}{3960}$ where W is the weight of the liquid, and H is the head in feet to which the water is raised.

The actual horsepower required to drive the pump is calculated from $BHP = \frac{W\ H}{33000\ E}$ or $\frac{GPM\ H}{3960\ E}$ E being the efficiency of the pump expressed as a decimal. The efficiency of the pump is the ratio of the water or theoretical horsepower to the brake horsepower:

$$E = \frac{WHP}{BHP}$$

The following formula may also be found useful in determining costs of operation, or for checking:

$$\text{Kilowatts Input} = \frac{GPM\ H\ Sp.\ Gr.}{5.308\ E\ E'}$$

Commercially, the motors supplied or recommended for centrifugal pumps are usually about 10 per cent larger in horsepower than would be indicated by the calculated *BHP*, as the pumps are usually designed to give slightly larger capacities than the nominal capacity.

Of the four sets of readings, the most important are those that provide the test points for the head-capacity *(HQ)* curve. From the *HQ* curve test points, the water horsepower can be calculated, and by referring this to the test brake horsepower, the efficiency-capacity *(EQ)* curve can be computed and plotted.

Making the Test

After the perliminary arrangements have been made; viz., installation and referencing of gauges, calibration of measuring devices and installation of meters etc., the test may be begun. The first reading is made with the discharge valve tightly closed. This gives a condition of zero capacity and maximum head. (This is not absolutely true in every case, for the design of the impeller may be such as to give a slightly higher head at small capacities than the shut-off head. This is due to the utilization of the velocity head of the water. However, stock pumps usually have steep characteristics, and the shut-off head is the maximum head.) The discharge valve is now opened by easy stages, readings of Q, H, N and P being taken at each stage. It will be noted that the capacity Q increases at each stage, while the head decreases. The power used will also be found to be increased. The motor speed should remain reasonably constant. The last stage will be reached when the discharge valve is wide open, and the pump is discharging against no head; at this time Q and P are at their maximum and H is at a minimum.

The tests of a small 6 inch x 4 inch single suction volute pump, operating against a 45 foot head, follow. At fifteen stages, sets of readings were taken as shown in columns Q, H and P, and the efficiency was calculated from these readings and entered in column E. The means of calculating E, was the combination of the formulas $WHP = \frac{Q\ H}{3960}$ and $E = \frac{WHP}{BHP}$, to give the relation, $E = \frac{Q\ H}{3960\ BHP}$, a simple slide rule operation. All calculations shown were made with a ten-inch slide rule.

Q-GPM	H-Ft.	BHP	E
00.0	66.5	2.70	0.0%
67.8	63.00	3.08	35.2%
118.3	60.3	3.37	53.5%
165.2	57.8	3.70	65.2%
213.7	55.0	4.08	72.7%
258.2	52.3	4.42	77.2%
281.5	51.0	4.63	78.3%
326.0	48.3	5.01	79.4%
370.0	45.7	5.41	78.9%
422.9	42.0	5.90	76.0%
493.4	37.4	6.54	71.3%
580.8	29.8	7.40	59.8%
609.6	25.8	7.71	51.5%
651.0	13.5	8.20	27.1%
665.0	00.0	8.60	00.0%

With this data it is a simple matter to construct a chart of the characteristics of the pump. The corresponding curves for the pump tests given above appear in Figure 4. It should be borne in mind when plotting these data, that any single point in the plotting may be in error, but that all of them should follow a definite law, unless some condition is introduced during the test to cause an abrupt change from one law to another.

If the material to be handled is heavier or lighter than water, the value of its specific gravity must be introduced into the formulas for finding the head, power and efficiency. If, however, a liquid containing a percentage of pulp is pumped, the problem becomes more difficult, for the reason that while the specific gravity of cellulose varies from that of water, the individual fibers are tubes, and are filled with water; the quantity of water being so much greater than the quantity of fiber present in ordinary solutions, that the change of specific gravity is negligible. But the effect of the fibers, while not varying the weight appreciably, does affect the losses due to friction in the pump and associated pipes, and thus has a large effect on the head pumped against. Because this friction loss varies greatly with the kind and condition of the stock, its temperature, and its freeness, pump characteristic curves as furnished by the pump manufacturer, are based on the performance pumping water. This is also true of the guaranteed efficiency. This is logical for the reason that the pump manufacturer cannot guarantee

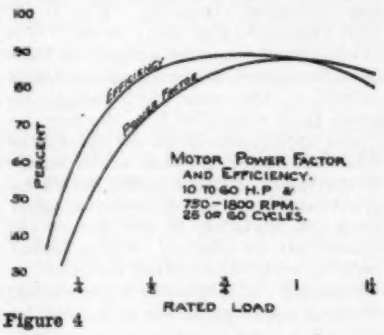


Figure 4

efficiency on stock without first testing the pump on the particular stock that is to be handled. Also in mill practice it is more economical and easier, although not as accurate, to test the pump on water and convert the water characteristics to stock characteristics later.

The exact effects of consistence, freeness and temperature are not known. Such experimentation as has been accomplished thus far, has neglected the effects of freeness and temperature, and but little has been published on stocks other than sulphite and groundwood. The chart shown in Figure 5 has been developed from some of the work done along this line, and is an average for all stocks. It may be used to determine the effect of various consistencies on the water characteristics of the pump.

The method of using this chart can

best be demonstrated by means of an example. Consider the curves, Figure 3, which have been developed for water. What effect would be evident on *Q* and *H* if a 3 per cent stock were handled? Note that the pump is delivering 300 *GPM* against a 45-foot head with an efficiency of 79 per cent as shown. It is obvious that with the same horsepower and with pump and pipe friction increased, the head or the *GPM*, or both, must decrease. Because the head is usually a fixed condition, the quantity discharged is naturally reduced. This, of course, affects the efficiency.

Referring to Figure 5, percentages of head and capacity are plotted as ordinates and percentages of consistence as abscissae. Selecting the consistence pumped; i. e., 3 per cent, and following up to the upper or head curve, find that 3 per cent stock causes a reduction

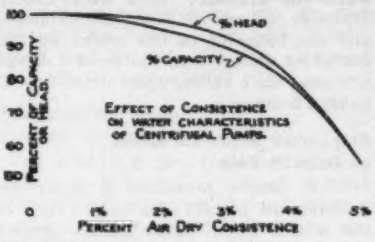


Figure 5

of head to about 93 per cent that of water. The reading of the lower or capacity curve is 89 per cent, indicating that the capacity is reduced to 89 per cent that of water. The efficiency of the pump will be reduced from 79 per cent to $0.93 \times 0.89 \times 79$ per cent $= 65.4$ per cent when pumping 3 per cent stock. The *WHP* when pumping water is *QH* 3960 or $300 \times 45/3960 = 3.4$ *HP*. A 5 *HP* motor would probably be recommended or provided. Now for stock, the motor size would be $3.4/0.654 = 5.2$ *HP*, and a 7½ *HP* motor would probably be provided if the head were to be maintained at 45 feet. If the 5 *HP* motor were to be retained, the head would have to be reduced to $45 \times 0.93 = 42$ feet, and the capacity will be reduced to $0.89 \times 300 = 267$ *GPM*. This difference in *H*, *Q* or *P* represents the additional losses over water, due to the presence of stock in the water.

Canadian Technical Section

Holds profitable and successful meeting

THE Technical Section of the Canadian Pulp and Paper Association held its twentieth annual meeting at Montreal on January 25 and 26. In spite of the unfavorable conditions prevailing in the industry, there was very good attendance at all the sessions, several of which were marked by very informative and spirited discussion. All those who were privileged to attend the meeting cannot but have come away with the impression that the technical men of the industry are very earnestly at work and are doing their full share in trying to rehabilitate the industry.

According to the time-honored custom, the first session was opened with a few words by the president of the parent association, Harold Crabtree. Speaking about the need for commercial research, Mr. Crabtree said he believed during the past year various commercial organizations had come to realize there was something in research after all. Largely through the strong representations made by D. L. McLeod, present chairman of the Section, and of Dr. J. S. Bates, one of the founders and first chairman of the Section, the Canadian Pulp and Paper Association had decided last year to continue its support to the program of research being carried on at the Pulp and Paper Research Institute. The grant, it is true, was smaller than in previous years; but it was indeed gratifying that it had been made in view of the extremely trying conditions prevailing in the industry.

After thanking Mr. Crabtree for his words of encouragement, chairman McLeod referred to the C. Howard Smith medal donated by Mr. Crabtree for the best paper relative to new uses of cellulose presented each year at the annual meeting of the Section, and Mr. Cadman, Secretary of the Section, read the rules governing the award of the medal. In recognition of the sustained encouragement given to the Technical Section by Mr. Crabtree during his three years as President of the Association, the Executive Council of the Section had been pleased to bestow honorary membership upon him.

The Chairman's report noted that, for the first time in its history, there had been a decrease in the membership, which had fallen off from 335 to 292; in view of the large number of technical men who had been lost to the industry through unemployment, this showing was certainly not discouraging. The interest of all members in the work of the Section had been fully sustained, and the esprit de corps had never been better. The Chairman drew attention to the facilities offered for technical men of the various companies to carry on investigational work at the Research Institute and using the equipment there, as well as to the facilities for routine testing of materials. He also made a plea that the executives in the industry support and encourage their technical men who take part in the committee work carried on by the Section.

The Chairman's report was followed by complete reports from each of the respective committees. The activities carried on by these committees during the year, the research, study of the industry's problems, and suggested plans for the coming year showed an unusual earnestness of purpose, and will assuredly bring far-reaching benefits to the industry.

Dr. James H. Ross, who succeeded the late E. P. Cameron as director of the Pulp and Paper Division of the Forest Products Laboratories in Montreal, next gave a review of the activities of the Division, outlining its aims and accomplishments from the time of its establishment in 1915 to the present time, and dealing more particularly with what had been accomplished during the last two years. J. d'A. Clarke and H. J. Rowley, commenting on Dr. Ross's paper, expressed deep appreciation of the exceptionally high quality of the work being done in the Forest Products Laboratories, which is an inspiration to all technical men and which is unexcelled in any similar institution anywhere. J. N. Stephenson and Prof. Hibbert suggested to the members of the Technical Section that they should drop in at the Laboratories when they had occasion to be in Montreal, in order to exchange information with the staff and more particularly to make known their desires regarding new investigations or the prosecution of investigations already under way.

The morning session was brought to a close by Dr. O. Maass who gave a brief account of the present stage of development reached in the various researches of interest to the pulp and paper industry which are being carried on at McGill University under his direction; these comprise studies of sulphite liquor equilibria, penetration, some aspects of sorption phenomena, opacity of paper, and light absorption and particle size. Chairman McLeod remarked that all this very valuable work was being carried on with very little financial assistance from the industry, and that undoubtedly no single investment was giving such a high return as the small amount that was contributed by the Association to aid this series of researches.

Fiber-Classifying Screen

On Wednesday afternoon Dr. H. Wyatt Johnston opened the proceedings by the presentation of a paper dealing with the new fiber-classifying screen on which he

has been working for some time with a number of co-workers. After explaining the principle underlying the method and reviewing the development of the method, he described in detail the construction and operation of the instrument as at present developed, including specifications for the construction of the proposed standard instrument, and presented the experimental evidence on which the procedure is based. Finally, Dr. Johnston gave the results of a study of representative groundwood pulps and also some experiments on the classification of a few sulphite pulps. The apparatus consists essentially of a number of screening units in which the fibers of a given pulp are classified according to length. Each unit is designed so as to present the fibers broadside—on to the apertures of the screen, the stock having a high velocity parallel to the surface of the screen, in such a manner that fibers shorter than the diameter of the screen openings will be allowed to pass through, while fibers longer than this diameter will fail to pass and are immediately removed from the vicinity of the screen openings. Dr. Sankey, chairman of the Committee on Standards, stated that the method was not intended to displace present methods of pulp evaluation, but was intended rather to supplement present tests. As far as can be judged from the work already done, the Johnston screening apparatus seems to give less arbitary results than other screening tests.

Freeness or Drainage Tester

Dr. W. Boyd Campbell gave a brief account of experiments undertaken to explore some of the factors which are concerned in the use of the British sheet machine as a freeness or drainage tester. He did not claim that the exploration was sufficiently complete to warrant the formulation of standard rules for operation, but hoped that sufficient information had been provided so that those operating the instrument in daily use would be guided into a similarity of practice and understanding of its action so that they would later meet on a common ground to set up standard rules for the test in the light of their experience. In reply to Mr. McLeod's query as to the practical advantages of the instrument over present-day freeness testers, Dr. Campbell was not quite confident to answer the question. He pointed out, however, that the test could be carried out incidentally to making sheets for strength tests; as regards the relative merits of the two tests, he was inclined to think that the higher head in the sheet machine, as compared with the freeness tester, yielded results in closer agreement with the actual behavior of the stock on the paper machine; the sheet machine also gave results which were based on the whole of the sample used in the test, whereas in the freeness tester a considerable amount of fiber is lost through the screen. In support of Dr. Campbell's opinion, Mr. Jas. d'A. Clarke, who has had considerable experience in the determination of drainage time on the British sheet machine, gave an example of two paper machines running on stocks having very nearly the same freeness (about 220 and 240), while the drainage times were widely different (about 11 and 49 seconds), and the behavior of the stocks on the machines agreed with the results of the drainage time rather than with the Canadian freeness.

Sulphurous Acid—Its Effect on Sulphite Pulp

L. P. Moore presented a paper describing the results obtained to date in the course of an investigation carried out under Dr. Hibbert's direction on the "Effect of Sulphurous Acid on Sulphite Pulp". Weighed amounts of highly purified alpha-pulp were heated for definite periods at temperatures varying from 30 deg. C. to 100 deg. C. with solutions containing 0.5 to 4.0 per cent of SO_2, and the changes effected were followed by determinating alpha-cellulose, copper number and cuprammonium viscosity. At 30 deg. there was a relatively small drop in viscosity, which increased with the acid concentration, while the copper number and alpha-cellulose were not appreciably affected. At 100 deg. there was an extremely rapid drop in the viscosity, irrespective of the acid concentration, and the alpha-cellulose and copper number were also considerably affected. Similar experiments will be carried out on standard cellulose in order to obtain comparative data.

Penetration in Sulphite Cooking

R. Demontigny reported work carried out mainly by Dr. H. H. Saunderson on "Penetration in Sulphite Cooking." It was found that the rate of forced penetration of sulphite liquor into wood increased with increased total SO_2 content, the effect being more marked at higher temperatures (presumably due at least partly to a slow cooking action), and that with low total and relatively high combined SO_2 a very definite inflection occurred in the rate of penetration-temperature curve near the point where precipitation occurred in a test sample of the liquor. Study of the adsorption of the constituents of sulphite liquor on spruce showed that this wood absorbs up to 0.4 per cent of its weight of free SO_2, but only up to about 0.1 per cent of combined SO_2, at 30 deg. C. As with true adsorption, the temperature coefficient is negative. With chips about one-fiber-length thick, this adsorption took place within 15 minutes after immersion, followed by a slow decrease in liquor strength, due presumably to chemical reaction. The results obtained so far are considered as proving that the slow rise in temperature necessary in mill cooks is due to lack of penetration rather than to the time required for any organic reaction to take place and thus "protect" the lignin.

Use of Low Sulphite for Newsprint

The most interesting session of the Technical Session meeting was held on Thursday morning, when there was a round table discussion on the use of low sulphite contents in the manufacture of newsprint. There was much animated discussion, of which the present report can give only a slight idea, and all those who are interested in this subject will no doubt find much profit in studying the stenographic account which will be published in the proceedings of the meeting.

D. W. Ambridge, of Anglo-Canadian Paper Mills, was selected to lead the discussion, as he has had personal experience for the last three years in operating various machines making newsprint with low sulphite content (varying from 26 per cent to 5 per cent. The technical problems involved in the use of low sulphite for newsprint, according to Mr. Ambridge, can be classified under three headings: *grinder room operation, paper machine operation* and *paper quality;* practically no changes are required in the operation of the sulphite mill, while the all-important factor, which overshadows all others, is groundwood quality.

Grinder Room Operation—In order to obtain a pulp of satisfactory quality, wood of not less than 0.360 density and not less than 40 per cent moisture content should be used, which permits of wide variation in grinder room operation. Moreover, Mr. Ambridge's experience with artificial pulp stones led him to believe that these stones tended to give pulp of a more uniform quality than natural pulp stones.

H. Buncke, of Abitibi, stated that his experience with smmall artificial stones in hydraulic grinders had been satisfactory; but the grinder room had never been run on these stones exclusively. H. B. McAdam stated that natural stones gave a pulp with closer freeness and higher strength; Mr. Buncke suggested that this might be due to the method of burring, but both Mr. Ambridge and Mr. McLeod disagreed quite definitely, stating that any kind of burr can give the desired results provided it is handled right. According to Mr. Fisher, of Price Bros., both for strength and for good finish it was essential to keep the freeness low.

Paper Machine Operation—Mr. Ambridge laid down the general rule that, other conditions being the same, a reduction in the sulphite content of the furnish necessitated slowing down the paper machine. Of course, it was impossible to lay down any general rules regarding the speed at which a machine could be run on newsprint containing a given amount of sulphite, but Mr. Ambridge showed some curves which he had drawn up, indicating general trends as they exist at the present time in the industry.

At this point there was a considerable discussion on the subject of the designing the slice and stock inlet, during which a number of varying opinions were offered.

Paper Quality—Mr. Ambridge next turned his attention to the effects of reducing the sulphite on the paper quality. As regards smoothness (or finish), cleanliness and color or brightness, these qualities are not affected. Not much is

known regarding absorbency, from this standpoint, but the speaker thought it might be improved by reducing the sulphite content; the deciding factor, he considered, was the quality rather than the percentage of groundwood. As to strength, it was possible to make a sheet of satisfactory strength with little as 8 to 10 per cent groundwood, provided the number of groundwood slivers was not excessive—if the slivers could be kept down, it should be possible to reduce the sulphite even lower than this. The last important paper quality, formation, is usually improved by a reduction in the sulphite content. Mr. Fisher mentioned another important factor in paper machine operation, and stated that vacuum drying should be of considerable benefit in improving the quality of the sheet when running with low sulphite; unfortunately, none of the other members present had had any experience with machines equipped with vacuum driers.

George Bearce, manager of International Paper's newsprint mill at Dalhousie, N. B., related his experience with high-speed operation. Running at 1100 to 1200 feet per minute, the sulphite could be reduced from 25 per cent to 20 per cent without making any difference in the strength of the sheet. If the various paper machine conditions were properly adjusted no difficulty was encountered, except a little more trouble at the reels which was presumably due to the drying.

Dr. H. Wyatt Johnston described the results of experiments which he carried out on fiber strength aspects. Three commercial groundwoods and one sulphite, all of news grades, were classified and the physical properties of all four pulps and their fractions in the screen classifier were measured. Relations were found to exist between fiber length, density, velocity of air transmission, time of drainage, tearing strength and breaking length. Mixtures of groundwood and sulphite were made and their classification and properties measured. Synthetic mixtures of groundwood fractions were also prepared and their properties were measured. Evidence was secured indicating that fibrillation exists in all fractions of sulphite and groundwood. It appears probable that groundwoods can be designed for special uses, provided that the fibers can be fibrillated without excessive reduction in size and the stock is subsequently screened carefully.

Luncheon of Technical and Woodlands Sections

The speaker at the joint Technical and Woodlands Sections luncheon on Thursday was the Honorable H. H. Stevens, Minister of Trade and Commerce in the Bennett Government. Mr. Stevens analyzed the present position of the Canadian pulp and paper industry, distributing blame where he thought it was due; though he placed the greatest burden on the shoulders of the capitalists, all those concerned in and connected with the industry received their share of criticism—the governments (for encouraging, practically forcing, the construction of new mills at a time when installed capacity was already sufficient), the executives of the industry, and even the technical men. Mr. Stadler, in thanking the speaker, agreed with much that he had said, but disagreed with him on a number of points.

Activities of Research Institute Reviewed

On resuming the technical sessions after the luncheon, Professor Harold Hibbert gave a review of the work carried out at the Research Institute, under his direction, during the past five years in the course of investigations dealing with some fundamental aspects of the chemistry of cellulose and wood. A very wide range of subjects has already been worked upon, comprising: standard method for the estimation of pentosans, pitch trouble in paper mills, structure and properties of cellulose, and structure and properties of lignin. The vast amount of work already done can be estimated from the list of 62 papers in which the results of these investigations have been published.

The last item on the agenda was a paper by C. M. Carmichael on "Acid Resisting Steel for the Sulphite Industry," in which he explained why some stainless steels fail in service and some do not. The metallurgy of stainless steels is very largely the metallurgy of chromium, and curiously enough the protective properties of this metal are due to its very high affinity for oxygen which results in the immediate formation of a very thin protective coating of oxide. Nickel is added to render the structure of the alloy austenitic, to make it non-magnetic, to develop passivity, and also to improve the mechanical properties. The speaker laid great stress on the importance of proper heat treatment to ensure the proper structure, failing which no stainless steel could stand up in the sulphite mill. This was illustrated by a large number of exceptionally fine microphotographs of both sound and defective metal. The company with which the speaker is connected has suggested the following specifications for stainless steel suitable for use in sulphite mills: carbon not over 0.20 per cent, chromium 19 per cent, nickel 8.5 to 9.5 per cent, molybdenum 3 to 4 per cent, silicon not over 0.50 per cent, together with appropriate heat treatment. The three main causes of failure of stainless steel in sulphite mills were: incorrect composition, incorrect heat treatment, and electrolytic action.

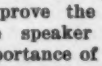
The meeting was brought to a close by the election of officers for 1933. F. L. Mitchell was elected chairman, succeeding D. L. McLeod, who was appointed the Section's representative on the Joint Administrative Council of the Research Institute. G. P. Genberg, D. Ambridge, S. Kidd and A. A. MacDiarmid were elected Councillors.

President Crabtree Re-elected

The annual meeting of the parent association, which was held at the Research Institute on Friday the 27th, was purely routine in nature. In his annual report, President Harold Crabtree stressed the need for more co-operation and less competition in the industry, otherwise 1933 would probably see no appreciable betterment of the conditions now existing in the industry. At the same time as he admitted that 1932 had been a year of great difficulty for the industry, he thought that the effects of the Imperial Conference preferences on Canadian Paper might eventually prove beneficial; but on the other hand the difficulties of exchange and depreciated currencies presented serious obstacles to any immediate benefit. The reports of the various sections of the Association all reflected the very difficult times through which the industry was passing. The meeting was brought to a close by the re-election of Mr. Crabtree as President for 1933.

Pulp and Paper of Canada Marks Anniversary

In order to mark the 20th anniversary of the Canadian Pulp and Paper Association and the 30th anniversary of *Pulp and Paper of Canada*, a dinner and smoker was held at the Windsor Hotel on Wednesday evening. This function was financed by individual subscriptions to tickets in addition to a contribution from the Magazine. A very attractive program had been arranged which greatly appealed to all those who recalled with pleasant memories the gatherings of the old days in the grill room of the Ritz Carlton Hotel, and numerous expressions of appreciation were heard, particularly from the older members, who voiced the wish that this function be resumed as a regular feature of the annual meeting.



◆ Charles Vose

Charles Vose, chairman of the board of Hollingsworth & Vose Co., East Walpole, Mass., passed away January 15, at the age of 84 years.

Mr. Vose started in the paper business in 1867 with the B. H. Thayer Co. of Boston. In 1867 he became associated with Z. T. Hollingsworth and formed the Hollingsworth & Vose Company, which at the present time is represented by the third generation of both families. In 1921 Mr. Vose retired as vice president, but continued to serve on the Board of Directors.

◆ John J. Hartley

John J. Hartley, Western Division chief engineer of the Link-Belt Company, Chicago, passed away suddenly, December 31, at the age of 39, the innocent victim of an assassin's bullet.

Mr. Hartley had been connected with the Pershing Road plant of the Link-Belt Company, Chicago, for the past 23 years, having entered the company's drafting room as a boy. Following a liberal experience in both the engineering and construction departments, he served the company in the capacity of sales engineer, and in 1929 was promoted to the position of chief engineer of the Western Division.

Physics and Chemistry of Cellulose*

Review of Dr. Mark's book, first volume of a series on technology of textile fibers

By JOHN L. PARSONS

DR. MARK'S new book on the physics and chemistry of cellulose is the first volume of a new series in the German language to be issued on the technology of the textile fibers. Under the general editorship of Dr. R. O. Herzog, well-known authority on fiber structure, these volumes bid fair to become outstanding treatises in their respective fields of fiber technology.

According to the announcement there are to be eight major parts to the series and for some of the individual parts more than one volume will be prepared. For instance, the first part is to be divided into three volumes: (1) the physics and chemistry of cellulose (the present book under review); (2) the physics and chemistry of the protein fibers; and (3) a manual of microscopical, physical and chemical methods of investigation. In the second part of the series, the mechanical technology of textile fibers will be covered, while in part three the subject of dyes and dyeing will be presented. Thus in these three sections or parts there will be a survey of the scientific and technologic knowledge on the subject of textile fibers.

The remaining volumes of the series are to deal more specifically with the individual fibers. Part four will cover cotton; part five, flax, hemp and the other rope fibers; part six, silk; part seven, synthetic fibers (rayon); and part eight, wool. Judging by the standard attained in the first volume, the entire series should be of considerable assistance in the further development of the textile, and other cellulose industries as well, on a more scientific basis.

The book, "Physics and Chemistry of Cellulose," is divided into twelve chapters of which three, comprising nearly half the total pages, are devoted to the subject of physics and the remaining nine chapters to the chemistry of cellulose. Chapter one ably deals with those mechanical properties of cellulose and its solid derivatives, such as strength and the various elastic properties. In the second chapter is a discussion of the properties of various cellulose solutions. Such properties include viscosity, lowering of vapor pressure, swelling, diffusion, surface phenomena, X-ray investigation, and degree of dispersion. Chapter three concludes the section on physics with a number of pages on the optical behavior of cellulose. The significance of investigations by means of polarized light, X-rays, cathode rays, etc., not only with cellulose but with its derivatives and decomposition products is explained. Over one hundred illustrations of physical testing instruments, diagrams, curves, X-ray photographs, etc., serve to make more clear the application of these new physical research tools to cellulose and its derivatives.

The remainder of the volume is concerned with the field of chemistry as applied to cellulose. Thus in the first chapter there is an excellent discussion of reactions and properties of micellar systems. Surface reactions, typical of solid cellulose, are considered, as well as the arrangement of the glucose groups in the cellulose unit. The Schwalbe copper number determination is described as a means of evaluating the length of the glucose chains in the cellulose.

Commercial and laboratory methods of obtaining cellulose are briefly described in chapter two, whereas the action of alkalies on cellulose and the field of heavy metal-ammonia-cellulose preparations are extensively treated in the two succeeding chapters. Four pages comprise chapter five on the action of salt solutions. Also brief consideration is given to the familiar reaction of carbon bisulfide and alkali. In chapter seven, covering the effect of acids on cellulose, the following acids are mentioned: nitric, acetic, perchloric, formic, propionic, benzoic, oxalic, carbonic, sulphuric and phosphoric, as well as the subject of mixed esters. About ten pages each are allotted to a study of the relations between nitric and acetic acids, and cellulose. Chapter seven includes in a few pages a general knowledge of the cellulose ethers. The last chapter, entitled the decomposition of cellulose, treats of the drastic effect of mineral acids, acetolysis, oxidation, heating under pressure in the presence of water, dry distillation, and the destructive effect of microorganisms and enzymes. A short appendix, and complete author and subject indexes conclude the volume.

The book is well printed on coated paper and appears attractively bound in durable green cloth. The author makes generous use of footnotes for his references, many of which bear the date 1932. The book should prove to be a valuable help to those who are able to read German and wish to be up-to-date in this rapidly enlarging field of knowledge as related to cellulose. In particular this first volume by Dr. Mark of the series on the technology of the textile fibers will prove to be informative and handy not only to those associated with the textile industries but equally well to all technical people in any of the various cellulose industries.

*_Physik und Chemie der Cellulose_ (Physics and Chemistry of Cellulose). By H. Mark. 330 pages; 145 illustrations. Volume one, part one, of a series of books on the technology of the textile fibres, under the editorship of Dr. R. O. Herzog, professor and director of the Kaiser Wilhelm Institute for Fiber Chemistry, Berlin-Dahlem. Published by Julius Springer, Germany. Price Reichmarks 45.— U. S. A. price $10.80, quoted by G. E. Stechert and Company, 31-33 East Tenth Street, New York, N. Y.

◆ Formulate Plans for Annual Superintendents Convention

Plans are progressing for the Fourteenth Annual Convention of the American Pulp and Paper Mill Superintendents Association which will be held June 8, 9 and 10 at Green Bay, Wis.

A tentative program has been prepared which provides for two days of business sessions. The first day will be devoted entirely to the presentation of papers and the second day will be given over to a general discussion of the papers that were presented on the previous day. Saturday, the last day of the convention, will be set aside for visits to pulp and paper mills in the vicinity of Green Bay.

Among the subjects to be covered by papers are the following: Nip Pressures with Rubber Covered Suction Rolls; Lubrication of Ball and Roller Bearings; Acid Circulation; Pitch; White Water Utilization; Micarta Bearings; Zinc Pigments in the Paper Industry; Lubrication of Reduction Gears; Chromium in the Pulp and Paper Industry; Unemployment Insurance; New Steel Compositions and their Relation to the Paper Industry; New Development in Paper Machinery; Safety; New Methods of Cooking Sulphite; New Uses and Future Uses of Paper.

Frank J. Timmerman, Northern Paper Mills is general chairman; and A. W. Bouffard of Green Bay is secretary of the General Convention Committee. Chairmen of the Subcommittees are: Finance, Mat Ketter, Hoberg Paper & Fibre Co.; Arrangements, H. W. Sherman, Northern Paper Mills; Entertainment, B. D. Bradley, Fort Howard Paper Co.; Registration, A. K. McNaughton, Northern Paper Mills; Transportation, H. D. Banta, Hoberg Paper & Fibre Co.; Women's Entertainment, Mrs. A. E. Cofrin, Green Bay; Reception, R. Radsch, Appleton Machinery Co.; Mill Visits, Edw. Den Dooven, Hoberg Paper & Fibre Co.; Publicity, Joe Hodgins, The Paper Mill & Wood Pulp News.

◆ Thomas J. Keenan Returns from Trip Abroad

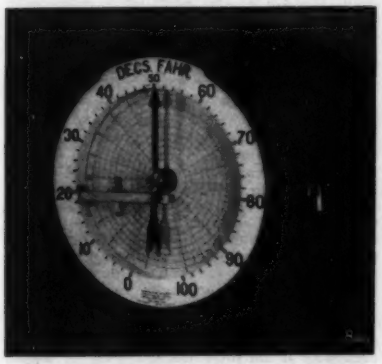
After three months abroad, Thomas J. Keenan, contributing editor of THE PAPER INDUSTRY, has returned to New York and reports a most interesting and beneficial trip.

The most enjoyable part of Mr. Keenan's travels was in visiting a sister and other relatives in Scotland whom he had not seen for many years. Taking a short trip over into Germany, he was the guest of Dr. A. St. Klein and his family in Berlin and the Harz Mountains. Mr. Keenan reports the weather was like summer at Schierke in the Harz Mountains and he enjoyed many tramps through forests of spruce and fir at an altitude of 2,000 feet or more.

Judging from Mr. Keenan's letters describing his experiences while on the ocean, he will be able to relate some interesting accounts of his thrilling experiences on the stormy deep. He proved himself a good sailor and missed none of the excitement of the trip.

◆ New Indicating Recorder

Leeds & Northrup Company, Philadelphia, Pa., has announced a new round chart Micromax indicating recorder. The instrument is reported to be especially valuable for recording temperatures of about 400 to 1000 deg. Fahr. It is also

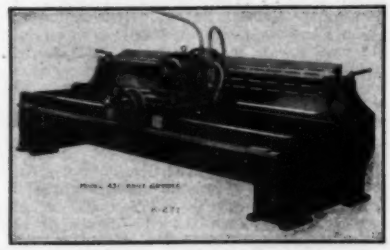


said to be adapted to the recording of smoke density, liquid levels, SO_2, speed, and solar radiation.

Among the features of the new instrument are a boldly lettered circular scale and a 24-hour circular chart. The chart, 10⅜ inches in diameter overall and with a calibrated portion 3½ inches wide, has straight-line time coordinates instead of curved ones. The recorder is made only as a single-point instrument.

◆ New Knife Grinder

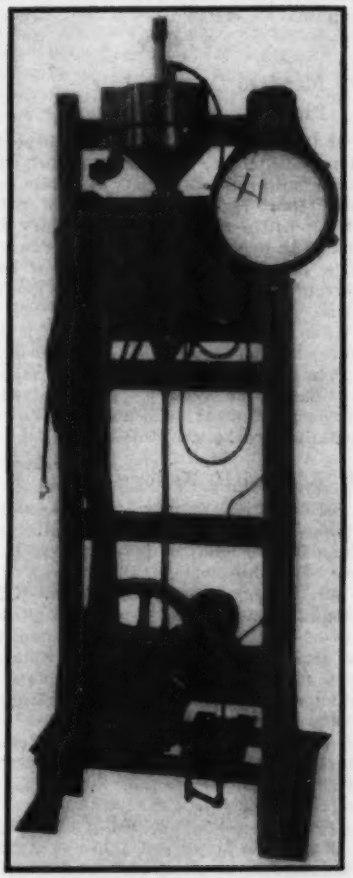
A new automatic knife grinder has been announced by The Coe Manufacturing Co., Painesville, Ohio. This grinder, designated as Model 431, is made in four sizes—the smallest being capable of handling a maximum length of knife of 88 inches, and the largest a knife length of 154 inches. The bed of the machine is of heavy construction and of such



design that it is said to assure vibrationless operation. Heavy trunnions carry the knife bar which may be rotated by a self-locking worm and gear mechanism that is controlled by a handwheel. The grinding wheel is mounted directly on the shaft of a 5 hp. motor equipped with preloaded ball bearings designed to prevent lateral movement of the shaft toward the knife but permits release in the opposite direction in case of overload. A swiveling feature of the base on which the motor is mounted permits concave grinding of the bevel as desired. A number of other interesting features are incorporated in the design of this grinder. Complete information will be submitted by the manufacturers upon request.

◆ Automatic Freeness Recorder and Controller

Paper and Industrial Appliances, Inc., 122 East 42nd St., New York City, has announced a new precision automatic freeness recorder and controller. This device is said to represent a development of many years, and with temperature and consistency correction can be



installed to record on a chart, at intervals that can be set from two to ten minutes, the freeness of any stock in circulation. It is also said that, under exclusive process patents, the machine can react automatically on jordan plug or beater roll, or change the sulphite supply when mixed with groundwood stocks.

◆ Fully Automatic Water Softener

A new fully automatic industrial zeolite water softener has been announced by The Permutit Company, 440 Fourth Avenue, New York. This softener is said to eliminate the errors due to the human element and conducts all of the operations of softening and regeneration with machine-like regularity and precision.

By a combination of a meter operated switch and electric controls with a motor-driven Permutit single valve, each operation of the water softener is conducted under precise control. Briefly, at the end of the softening run, the meter actuates the electrical controls which carry through the steps of: Cutting the softener out of operation; backwashing it for a regulated period so as to secure thorough cleansing; admitting a carefully regulated amount of saturated salt brine so as to assure thorough regeneration without wastage of salt; rinsing out the hardness salts to waste with the minimum amount of rinse water; and throwing the softener back into service thus placing it again under control of the meter, which governs the volume of water to be softened during the softening run and initiates the start of the next regenerating cycle.

◆ Motorized Speed Reducer

A speed reducer and motor combined as a single unit is now being manufactured by D. O. James Manufacturing Co., Chicago.

These units are available in sizes from ½ to 20 hp., and in a wide range of ratios and speeds.

◆ Worm Gears for High Speed Ratios

A new line of double reduction worm gears has been developed by the De Laval Steam Turbine Co., Trenton, N. J. In this line a greater flexibility in the arrangement of the drive has been gained by using separate housings for the high speed gear and the slow speed gear. For example, a unit with vertical slow speed shaft can be combined in six

ways: namely, with the high speed shaft at the right and with the vertical driven shaft extending either upward or downward, or in both directions, and similarly with the high speed shaft at the left. A unit with horizontal slow speed shaft, can have the high speed driving shaft extended in either or both directions, and likewise the slow speed shaft. The worm may be rotated either clockwise or counter-clockwise, facing the worm from the motor or driving position. Standard gear sets are cut with right-hand threads.

All gear tooth and worm surfaces and the bearings are lubricated by a splash

system, the high speed gear wheel and the slow speed worm dipping in an oil bath in the casing. The high speed worm shaft and the shaft which carries the high speed gear wheel and the slow speed worm have ball bearings. The slow speed shaft, which in double reduction gears may be called upon to carry considerable forces, has plain sleeve bearings, or, in units in which the slow speed shaft is horizontal, may be fitted with tapered roller bearings.

◆ Louis Allis Splash-Proof Motor

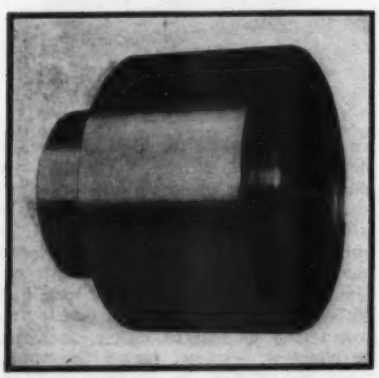
A splash-proof motor designed to prevent entrance of water splashed with terrific pressure from any angle, yet adequately ventilated and built in the same dimensions as standard open motors, has been perfected by The Louis Allis Co., Milwaukee.

A double baffle in an elliptical-shaped air passage in each endbell provides the protection offered by this motor. This unique construction, while permitting free passage of ventilating air, traps

and drains water splashed into the air openings at the bottom of the elliptical-shaped chambers. Another original feature is a shaft guard which breaks the force of a stream directed along the shaft extension and prevents water from entering the bearing chamber.

◆ Kelpo Free-Wheeling Clutch

The Kelpo Clutch Company, Rockford, Ill., announces the introduction of the Kelpo Free-Wheeling Clutch in standard



sizes from fractional hp. to 500 hp. for use on dual drive pumps, fans, generators, printing presses, paper mill machinery and special machine applications. Special clutches for synchronous condenser operation of steam turbine generators and other special applications involving much greater horsepower capacities can be furnished.

By using this clutch to connect the prime mover to the load of a dual drive machine, the prime mover, which is not in use automatically, remains at rest.

All wearing parts are being made of hardened steel ground to exact shapes and contour. The clutch is filled with grease and is said to require no more attention than any lubricated flexible coupling.

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◆ Mead to Operate Idle Plant on Soda Pulp

It is reported that the Mead Corporation, Chillicothe, Ohio, has opened its straw pulp mill which has been idle for some time, for the production of soda pulp. Little change was necessary in changing over the plant from straw to soda pulp, as the manufacture of the two processes requires similar equipment.

It is announced that the move is in line with the recently inaugurated buy-at-home programs announced in many sections of the country. The plant will employ a number of skilled as well as unskilled workers.

◆ Edward H. Kellogg

Edward H. Kellogg, general sales manager of the Mine Safety Appliances Company, passed away suddenly January 9, at his home in Pittsburgh.

Mr. Kellogg was born at Russell Kansas, January 29, 1892. He was a graduate of the Kansas State College, where he majored in chemistry. Mr. Kellogg was well known in the paper industry, having been associated with the Brown Company in special kraft paper research work at LaTuque and Berlin during 1919, and in 1921 did special work for the Bureau of Standards in experimenting with flax straw.

The deceased is survived by his widow and a son, a sister and a brother. The brother, R. S. Kellogg, is secretary-treasurer of the News Print Service Bureau, New York City.

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◆ New Catalogues and Publications

Bennett, Incorporated, 143 Sidney St., Cambridge, Mass.—The Bennett Size-Making Process is the title of a new, illustrated bulletin of this company. The cover stock for the bulletin and the paper upon which it was printed were supplied by two paper manufacturers that have installed Bennett size-making equipment. The process, the equipment necessary for it, and methods of preparing rosin size, rosin-wax size and wax emulsions are described.

Department of Commerce, Washington —Commercial Standard CS42-32, Fiber Insulating Board, as adopted by representative manufacturers, distributors and users of this commodity, has been published by the U. S. Government Printing Office, and may be obtained by them for 5 cents per copy.

Detroit Stoker Company, Detroit, Mich. —The Detroit Multiple Retort Stoker is the subject of a new bulletin. The salient points in the principle and operation of the Stoker, which is designed for large boilers to be operated continuously at extreme ratings, are clearly explained with accompanying photo-diagrams in color. The company's engineers will gladly make recommendations to meet the individual requirements of any architects, engineers and plant owners. Other types of stokers are available for smaller boilers.

Electro Metallurgical Co., 30 E. 42nd St., New York City—A booklet called Stainless Steels and Their Uses, gives a brief summary of the major applications of stainless steels in various industries. Paper mill uses are mentioned specifically. Copies on request.

Foxboro Company, Foxboro, Mass.—Bulletin No. 175 features the theory and operation of the Stabilog system of automatic control. Separate sections of the bulletin are devoted to descriptions of the application of the system to temperature, pressure, liquid level and flow control. Engineers and executives may obtain a copy upon request.

General Electric Co., Schenectady, N. Y. —Among literature recently issued by this company is bulletin GEA 1145B, in which steam turbine installations in a number of plants are illustrated. One figure is that of a turbine driving a paper machine. Details of such installations are covered and the principles of construction of the G-E steam turbine explained. A new four-page bulletin briefly describes the new G-E Photoelectric recorder and indicates some of its uses, including the recording of the thickness of paper.

B. F. Goodrich Co., Akron, Ohio—An 18-page booklet on the subject "Cutless Rubber Guide Bearings as Applied to Hydraulic Turbines," has just been published by this company. The text was written by R. E. B. Sharp, hydraulic engineer, Baldwin-Southwark Corp., I. P. Morris Div., Philadelphia, Pa. The booklet is profusely illustrated and goes exhaustively into the subject of Cutless Rubber Guide Bearings for hydraulic turbines, and presents material that should be valuable to anyone making a study of bearing problems in any field. Copies upon request.

E. F. Houghton Co., Third American and Somerset Sts., Philadelphia—In a booklet entitled "Vim Tred Leather Belting," this new belt with a so-called non-skid surface is described. The non-skid feature is produced by pressing down or indenting part of the surface of the belt and is said to increase the gripping power of the belt.

Moore Steam Turbine Corp., Wellsville, N. Y.—Six Ways to Reduce Power Costs is the theme of a booklet just sent out by this company. Six important turbine installations are illustrated and explained, each accompanied by a blue print drawing. The types covered are: non-condensing, bleeder, mixed-pressure, mixed-pressure bleeder, low pressure and high back pressure.

New Jersey Zinc Co. Using Paint as Light is a writedown of a highly technical paper given by D. L. Gamble of this company's Research Division at the annual convention of the Illuminating Engineering Society a few months ago. Measurements of light reflected from walls painted in different colors have been illustrated on unique charts showing the relative amount of illumination in foot candles. This is a subject of extreme interest to any industrial plant.

Schutte-Koerting Co., Philadelphia—An 8-page bulletin, No. 6-F, describes S&K rotameters and flow indicators. Several new types of rotameters are shown, the rotameter being a flow metering instrument to show rates of flow of water, oil air, gas, chemicals, etc.

Yarnall-Waring Co., Chestnut Hill, Philadelphia—Bulletin EJ-1904 covers cylinder guided expansion joints. Features of the company's new Gun-Pakt Joint are fully described in this circular.

POWER

GENERATION + UTILIZATION + MAINTENANCE

This section turns the searchlight on power and its allied problems, showing big possibilities to save. Opportunities to improve conditions, methods, apparatus will be discovered. Worth while practices suggest new ideas and wider usages of equipment.

By W. S. JOULE

◆ Trend Toward High-Speed Turbo-Generators

Due to the substantial advantages in space, weight, and efficiency, the trend in the last few years has been to design large turbo-generators with a higher speed. In 1899, the first American turbo-alternator for a speed of 3600 r.p.m., the maximum possible for generating 60 cycle current, was built, and for years it was considered that the speed was excessive. The proper figure was thought to be about 750 r.p.m. Less than ten years ago the largest turbo-generators ran at 1200 r.p.m., moderate sized ones at 1800 r.p.m., and small ones at 3600 r.p.m. Now, 1800 has superseded 1200 r.p.m. for even the largest units, and is itself being pushed from below by the still higher speed. Today, a 22,500-kv-a. unit is the largest, operating at a speed of 3600 r.p.m., and engineers are planning on generators of this speed at even greater capacities.

◆ Size of Reducing Valves Important

Reducing valves that are too large for the amount of steam they are to pass are usually unsatisfactory. Either they will open and close continually and chatter violently, or will stand in a position nearly closed and become steam-cut and leaky. It is more satisfactory to use two small valves in parallel, one set slightly heavier than the other, so that one will supply steam up to its maximum capacity before the other opens. Another way is to use one reducing valve equal to about one-half the maximum demand, and a bypass of about the same capacity with a hand-operated valve in it, so that when the reducing valve reaches its capacity the bypass valve may be opened wide and the reducing valve will close down and simply make up the shortage. This, of course, requires that an attendant shall observe the pressure gauge occasionally.

◆ Taking a Boiler Off the Line for Cleaning

When a boiler is taken out of service for cleaning, a definite procedure should be followed in draining and cooling. Before closing the stop valve, burn the fire out as much as possible, then cut the boiler out of service and allow the fire to burn out, dump through, or remove it from the grate. If the time will permit, the boiler should be allowed to cool off slowly and to stand for 24 hours before opening. If necessary to admit air to cool the furnace, it should be admitted below the grate, not through doors or openings in the side of the setting; in this way the boiler and setting will cool down more uniformly.

When the water has finally cooled down and the pressure is at zero, open the blowdown wide and allow the boiler to drain. Be sure to vent the drum at some point above the water line. Do not blow off under pressure, as this sets up stresses on the joints and the heat of the boiler and brickwork will bake the mud and scale in the boiler making it difficult to remove.

◆ Maintenance Work Should Be Systematic

Maintenance might be defined as the work and expense involved in keeping a plant in first-class operating condition. Under this definition it would include the cost of up-keep replacement and the precautionary measures necessary to insure reliable plant service. Unfortunately, some engineers have looked upon maintenance as a necessary evil connected with operation and have looked after such work only to the extent necessary to keep the plant in operation. This putting off of more complete maintenance work, is something which eventually reacts on the reliability of service and in the end is likely to be more costly than if the work is done systematically, at the time it is needed.

A new plant may be kept running several years, with comparatively little maintenance, but during that time deferred charges are accumulating that must eventually be met. Repairs and renewals must then be made simultaneously, on a large amount of equipment, thus impairing service and sending the cost of maintenance suddenly skyward. Of course, maintenance work can be carried to the extreme, in which case the idea would be to keep the plant in a state like new. But since such a condition could only exist in theory, some practicable limit must be established by investigation and experience. Even then, however, maintenance is not to apply indiscriminately for, to become a real economy, it should be efficiently standardized.

Frequently, operators are inclined to confuse maintenance work with operation. It is entirely possible, and it will often be found that well-operated plants are not ones which are well maintained; that is, more thought given to the maintaining of high efficiency than is given to systematic work in connection with keeping the station in a condition which will assure reliable service. The reverse condition is also found, where much attention is given to upkeep of the station and the operating conditions, which lead to high efficiency, are neglected. It is obvious that highly polished brass work and a general spick and span appearance of the station are not of much value, if the overall efficiency is 5 or 10 per cent below that which could easily be secured by a proper understanding of operation.

◆ Laying Out a Maintenance Plan

Maintenance in some plants is set off by itself, as apart from the normal routing of producing power as efficiently as possible. In this case, there are two distinct divisions of the work, the first being a combination of inspection and record keeping, the second consisting of repairs and renewals.

Efficient inspection and records should be the basis of maintenance and the elaborateness of the work should conform to the size and importance of the plant.

One of the first essentials is periodic inspection, the frequency of which will vary according to the type of apparatus and the purpose for which it is used. All equipment in a given power plant should be divided into groups corresponding with the name of the apparatus and then further classified according to the approximate number of inspections during any period of time. This is practically dependent upon the amount of use the apparatus is likely to have during the selected period and the final classifications should, therefore, be made under daily, weekly, semi-monthly, monthly, bi-monthly, semi-annual and annual inspections.

◆ SOLUTIONS FOR the Orsat may be made as follows: For oxygen, put 1 oz. of pyrogallic acid (powder) into a quart of water, pour in a pint of caustic solution (see solution for CO_2), and immediately seal the bottle air-tight until used. For CO_2, dissolve 1 lb. of caustic potash in 2½ pints of water. For CO, acid cuprous chloride is used. Put a ½-inch layer of copper oxide in the bottom of a quart jar. Put in a bundle of a dozen lengths of No. 10 or 12 gauge bare copper wire cut to length a little less than the depth of the jar. Fill the jar with hydrochloric acid, seal and shake occasionally for 48 hours. Pour off the clear solution and seal it.

+ CANADIAN NEWS +

◆ Newsprint Output Down 14 Per Cent

For the month of December, production of the Canadian newsprint mills at 138,682 showed a sharp drop from the preceding month, when the output amounted to 161,334 tons, while in December of 1931 production by the mills in the Dominion amounted to 165,173 tons. Shipments in December from Canadian mills amounted to 140,770 tons, including an estimate for one company whose exact figures were not reported.

Production during 1932 amounted to 1,907,566 tons, a decrease of 14.1 per cent from the 2,221,454 tons produced in 1931. In 1930 the output of the mills in the Dominion amounted to 2,504,147 tons, while in 1929, when the peak of production was established, the output totaled 2,728,827 tons. Exports of newsprint during 1932 were valued at $82,966,199, as compared with $107,233,112 in 1931.

◆ Canada Makes Trade Agreement With Germany

By a three-month temporary trade agreement between Canada and Germany, an enlarged market for Canada's wood pulp and pulp wallboard has been secured in Germany. Under the agreement, all Canadian goods, for the first time in 35 years, will be accorded most favored nation treatment by Germany. In return, Canada grants the intermediate tariff on German goods. A definite treaty is expected to be concluded between the two countries before March 31.

A vast increase in many exports to Germany from this country is forecast as a result of the new convention. The increase which is expected in the market for wood pulp is estimated at $1,000,000 per annum, and wallboard is expected to find an important new market.

◆ Bank President Expresses Views on Price Cutting

Sir Herbert Holt, who has been a prominent figure in connection with the Canadian newsprint industry for many years, made some outspoken remarks in regards to the industry in speaking in his capacity as president of the Royal Bank of Canada, at the annual meeting of the shareholders of that institution held in Montreal last month.

"Probably no major industry in Canada, save railways and agriculture," said Sir Herbert, "has suffered more from the drastic decline in consumption than the Canadian newsprint industry, with the result that the mills find themselves with productive capacity far in excess of present-day requirements.

"The difficulties in the industry have been materially enhanced by extreme and unjustly competitive methods, which have resulted in the burdens due to lower consumption bearing more heavily on some plants than on others. The view, which is still expressed, that high-cost producers should be eliminated and capital structures pared down, can now be regarded as almost meaningless. In substance, this adjustment has already taken place and high-cost mills are not now operating.

"In spite of drastic economies, the industry now faces the difficulty of covering its actual operating expenses, before provision for any interest or depreciation. In these circumstances, a continuation of price cutting methods is not in the interests of the people of this country, particularly the workers in our woods and mills, and if the strong efforts that are being made to secure co-operation are not successful, Provincial governments must take steps to conserve Canadian natural resources, and to prevent the collapse of this vitally important industry."

QUEBEC

◆ IN ORDER TO ACCEDE to the request made by the authorities in certain districts that there be a reduced rate for the cutting of lumber, so that unemployed and needy families may be afforded an opportunity to earn a living, the Provincial Lands and Forests Department has passed an order-in-council putting into effect the following stumpage rates, to be effective for this winter, in the township reserves, as well as for timber cut on leased lands: white pine, elm, ash, basswood, birch, maple, tamarack, $1.50 per 1,000 feet board measure; spruce, balsam, grey pine, hemlock, white birch, aspen, poplar, cedar, $1 per 1,000 feet board measure; softwood, 25 cents per cord of 128 cubic feet; hardwood, 50 cents per cord of 128 cubic feet.

◆ A POOR MARKET, due in part to considerably reduced construction work in the province and decreased export to the United States brought about by the prohibitive tariff which has been set up there, will probably result in a slightly lower pulpwood cut this season as compared with a year ago, according to G. C. Piché, chief of the forestry branch of the Quebec Department of Lands and Forests. Mr. Piché stated that the season's cut is almost completed, many of the camps are closing down and preparations are under way for the drive.

◆ A REGULATION regarding necessary first aid equipment for lumber camps, suggested by the Quebec Pulp and Paper Safety Association, was approved last month by the provincial government in an order-in-council which provides that every employer must furnish and maintain in each store or depot the minimum first aid equipment, comprising certain instruments, medicines and dressing.

◆ THE PAPER MILL of the E. B. Eddy Co., at Hull, after being on half-time operation for two years, has just resumed full time. Large contracts recently secured from several United States publications will bring up the operations to about 30,000 tons a year, the capacity output of the mill.

◆ John Drysdale Robb

The death of John Drysdale Robb, sales manager, Dominion Engineering Works, in Lachine, Quebec, on December 24th, came as a great shock to his many friends throughout Canada. Mr. Robb was born 48 years ago in Edinburgh, Scotland. After graduating from George Watson's College in Edinburgh, he studied papermaking under his father, who survives him, and who is at present chief engineer of the Kinleith Paper Mills at Currie, Midlothian, Scotland. He later studied papermaking at the City and Guilds of London Institute, receiving their diploma.

Mr. Robb was connected with James Bertram and Sons of Leith Walk Foundry, Edinburgh. He also served for a time with James Milne & Son. He later became London and European representative of Bertram's Limited, of Sciennes, Edinburgh. He was sent to Japan for the latter company to supervise the erection and starting of a new paper mill.

Mr. Robb remained in Japan to manage a mill there, later commencing operations on his own behalf as paper mill engineer, also as representative of several British concerns dealing in paper mill equipment. Mr. Robb lost everything in the Japanese earthquake of 1923, he and his family narrowly escaping with their lives. Backed by a world wide experience in papermaking, Mr. Robb came to Canada after the earthquake and was connected with Dominion Engineering Works until his death.

He was a member of the Engineers' Club, Montreal, and the Technical Association of the Pulp and Paper Industry.

The deceased is survived by his widow, three sons, his father and two brothers.

◆ HAROLD SMITH, formerly of the Canadian Paperboard Co., Toronto, now closed down, has gone to Montreal as representative of the Gerald T. Shipman Co., selling agents for the output of Beaver Wood Fibre Co., Thorold, Ont., and the Bathurst Pulp and Paper Co., Bathurst, N. B. Temporary offices have been opened in the New Birks Building, from which sales in the eastern territory will be directed.

◆ A REDUCTION in the price of cellophane, effective retroactively to the beginning of the year, was announced last month by Canadian Industries, Ltd. Although operations only commenced in the late spring of last year, the new industry has shown marked signs of having established itself on sound lines in Canada. This price reduction is yet further evidence of the fact.

◆ GATINEAU Power Co. reported last month that its production of electric energy in the month of November was the

highest for that month in the history of the company. Production reached 245,323,000 kilowatt hours, or 15 per cent over November, 1931, 11 per cent over November, 1930, and 17 per cent over November, 1929.

◆ PRICE BROS. and Co. have made application to the Quebec Public Works Department to obtain permission to build a small dam at the outlet of Lake Claire, La Trap township, Lake St. John County, for the purpose of creating a sufficiently high level of water above the dam to permit of the driving of the company's pulpwood.

◆ EMILE MERCIER, employed at the Windsor mills of the Canada Paper Co., was fatally injured January 29. He was cleaning out the press in a pulp grinder, when the machinery was started from some unknown cause.

ONTARIO

◆ George R. Gray

George Reginald Gray, vice president of Abitibi Power and Poper Co., passed away last month at Sault Ste. Marie, at the age of 68 years.

In 1901 he was one of the organizers of the Spanish River Pulp and Paper Co., which was afterwards taken over by Abitibi. For twenty years he was manager and director of the woods operations of the company, until 1922 when he was appointed vice president. When the company was absorbed by Abitibi he was made a director and in 1928 vice president. He also had been president of the Manitoba Paper Co. (a division of Abitibi) and of the Kaministiquia Power Co., while he held directorates in other commercial projects.

◆ ABITIBI Power and Paper Co. will move from 70,000 to 80,000 cords of pulpwood already cut on the Vermilion, Onaping and Spanish Rivers to points nearer the Espanola mill, and this work will provide employment for between 150 and 200 men during the river driving season this spring. Nothing definite could be ascertained regarding reports that this step was preparatory to the reopening of the Espanola and Sturgeon Falls mills of the company.

◆ Personnel Changes at Hinde and Dauch

F. F. Arnoldi, formely sales manager of the Toronto division of Canadian Paperboard, has joined the Hinde and Dauch organization in the capacity of sales manager of its boxboard division. T. J. Gillelan, formerly purchasing agent with Canadian Paperboard, has been appointed chief sales clerk of the Hinde and Dauch boxboard division. R. W. Coulter, formerly chief mill clerk at Canadian Paperboard's Toronto plant, has been appointed order clerk with the boxboard division of Hinde and Dauch.

In the Hinde and Dauch boxboard plant itself—the No. 1 mill—F. Dieckbrader, who was formerly superintendent of the Toronto division of Canadian Paperboard, has become assistant superintendent, with R. M. Cook as general superintendent of the whole concern. A. J. Bingham, who was head of the receiving department of Canadian Paperboard at Toronto, occupies the same position with the boxboard division of Hinde and Dauch.

Hinde and Dauch has also taken over its complete boxboard division crew from workers previously with Canadian Paperboard, these including machine tenders, back tenders, all machine help, beater engineers, beater help, stock men and finishers. In taking on these men, Hinde and Dauch has not displaced any of its previous employees, but its No. 1 mill is now manned entirely by former Canadian Paperboard men.

◆ THE ONTARIO paper trade is about to lose one of its most esteemed members in the person of H. A. Goldsborough, who for the past ten years has been an active member of the staff of the Hodge-Sheriff Paper Co. He has stated that he is being spiritually guided to England, where he will engage in business to be conducted on the same religious principles that mark the Oxford Group Movement.

◆ LAST MONTH the Port Arthur Utilities Commission received $305,000 from the receivers of the Abitibi Power and Paper Co. The amount covered arrears of power charges contracted for by the Thunder Bay Paper Co., a going concern, stock of which is owned by Abitibi, now in bankruptcy. Under the terms upon which the $305,000 was forwarded to the Commission, a sum of $61,000 will be refunded if the mill in Port Arthur is operated from now until the store of pulpwood on hand is exhausted. It is believed that there is sufficient wood to operate the mill for a year.

BRITISH COLUMBIA

◆ ACCORDING to President Lawrence W. Killam, of the British Columbia Pulp and Paper Co., business with his firm has been better than was anticipated. Demand for pulp is nothing to get excited about; but it has been sufficient to keep both mills operated by the company fairly busy. The Woodfibre plant was re-opened three months ago, and the Port Alice mill a few weeks later, and in each case it had been expected that operations would last only from four to six weeks. At present, however, there seems to be no likelihood of an early shutdown, and there have been sufficient orders to keep both mills in steady operation.

NEW BRUNSWICK

◆ ACTIVITIES of Fraser Companies continue at a relatively low level. Demand for its pulp and paper products from the United States, the company's chief market, is still slow, while low prices for pulp tend to narrow margin of profit on sales in the Eastern Canada division. Operations in the catalog department at Madawaska are reported as satisfactory. A new contract was secured recently which will enable this division to increase its output.

◆ T. M. BARRY, formerly assistant general superintendent of Fraser Paper, Ltd., Madawaska, Me., and Donald A. Fraser, formerly head of the standards department at Edmundston, have been appointed to the position of assistant to the president of Fraser Companies, Ltd., with headquarters at Edmundston.

MANITOBA

◆ Request Reopening of Pine Falls Mill

Seeking reopening of the Manitoba Paper Co.'s mill at Pine Falls, a delegation from Winnipeg that included Hon. J. S. MacDiarmid, Minister of Mines and Natural Resources, last month interviewed G. T. Clarkson, receiver of Abitibi Power and Paper Co., parent company of the Manitoba Paper Co. They urged upon Mr. Clarkson the pressing need to reopen the mill.

Mr. Clarkson said he would take the matter under advisement, but would not be able to make a definite statement until certain conditions had been studied. He declined to say anything on the nature of the conditions referred to.

The mill at Pine Falls was closed February 24, 1932, throwing a large number of men out of employment and removing a market for pulpwood previously enjoyed by many settlers of the district.

◆ ◆ ◆

◆ News Print Service Bureau Officers

At the annual meeting of the News Print Service Bureau in Montreal, January 27, the following officers were elected for the ensuing year: President, C. K. Blandin, Blandin Paper Co., St. Paul; vice president, A. R. McMaster, Powell River Co., Ltd., Vancouver, B. C.; Secretary-Treasurer, R. S. Kellogg, New York City. The members of the Executive Committee are: L. J. Belknap, Consolidated Paper Corp., Montreal; N. C. Head, International Paper Co., New York City; L. R. Wilson, Abitibi Power & Paper Co., Ltd., Toronto.

◆ Norton Elects Higgins President

At the annual meeting of the Norton Company, Worcester, Mass., January 17, Charles L. Allen announced his retirement as president and general manager of the company. He had been associated with the company since the incorporation of the old Norton Emery Wheel Co. in 1885, and has been the company's only general manager. He had served as president since 1919. Mr. Allen was elected chairman of the Board of Directors and will remain in close touch with its activities.

Mr. Allen is succeeded by Aldus C. Higgins, who is a son of one of the founders of Norton Company and its first president, Milton P. Higgins. He has been associated with the company in an executive capacity since 1900.

Appleton Felts today meet all operating conditions because they have kept pace with changes and progress in paper making. That's why after 42 years Appleton Felts are standard for quality and service. Made for the definite requirements of the customer, they continue to safeguard the quality of your product.

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The Paper Industry Safety Contest

July 1, 1932, to June 30, 1933
Scores as of December 31, 1932
22 Mills Now Competing

PERFECT SCORES

Division I—Paper and Pulp Mills

	PARTICIPANT	MILL	LOCATION
GROUP A	Hollingsworth & Whitney Co.	Algonquin & Taconnet	Winslow, Me.
	Champion Coated Paper Co.	Paper No. 2	Hamilton, Ohio
GROUP B	The Champion Coated Paper Co.	Paper No. 1	Hamilton, Ohio
	Fraser Companies, Ltd.	Fraser Paper, Ltd.	Madawaska, Me.
	St. Croix Paper Co.	Woodland	Maine
GROUP C	Escanaba Paper Co.	Escanaba	Michigan
	Marinette & Menominee Paper Co.	Menominee	Michigan
	Cornell Wood Products Co.	Cornell	Wisconsin
	Consolidated Water Power & Paper Co.	Appleton	Wisconsin
GROUP D	Consolidated Water Power & Paper Co.	Biron	Wisconsin
	Port Huron Sulphite & Paper Co.	Sulphite	Port Huron, Mich.
	U. S. Gypsum Co.	No. Kansas City	Missouri
	International Paper Co.	Livermore Falls	Maine
	U. S. Envelope Co.	Morgan Paper Div.	Litits, Pa.
	International Paper Co.	Riley	Maine
	Container Corp. of America	Carthage	Indiana
	U. S. Gypsum Co.	Gypsum	Ohio
	Hollingsworth & Whitney Co.	Albenaquis	Madison, Me.

DIVISION II—Remanufacturing

Kimberly-Clark Corp.	Atlas	Appleton, Wis.
Consolidated Water Power & Paper Co.	Stevens Point	Wisconsin
Container Corp. of America	Natick	Massachusetts
Bemis Bro. Bag Co.	East Pepperell	Massachusetts

IMPERFECT SCORES—Division I

	Key	Rank	Points Credit	Points Debit
GROUP A	PA-11	3	866.368	
	PA- 6	4	741.344	
	PA-12	5	563.728	
	PA- 7	6	544.016	
	PA-13	7	509.024	
	PA-14	8	287.776	
	PA- 4	9		2,364.464
	PA- 8	10		3,226.016
	PA- 5	11		7,322.464
GROUP B	PB- 5	4	918.272	
	PB-14	5	917.888	
	PB-21	6	913.552	
	PB- 7	7	832.336	
	PA- 3	8	764.512	
	PB-18	9	713.520	
	PB-17	10	694.480	
	PB- 3	11	555.104	
	PB-22	12	466.032	
	PB-13	13	420.960	
	PB-20	14	380.352	
	PB-19	15	342.176	
	PC- 1	16		222.304
	PB- 6	17		318.688
	PB-15	18		496.336
	PB-12	19		756.144
	PA-10	20		4,495.760
	PB- 2	21		5,724.000

Division II

RB-2	5	909.968	
RB-1	6	458.448	
RC-1	7	433.232	
RB-3	8	277.792	
RD-3	9	277.056	
RD-7	10	221.904	
RD-6	11	191.680	
RC-3	12		323.424
RA-1	13		1,182.688

	Key	Rank	Points Credit	Points Debit
GROUP C	PC-20	5	890.768	
	PC-16	6	869.264	
	PC-26	7	906.000	
	PB-10	8	771.568	
	PD- 5	9	705.264	
	PC-24	10	699.584	
	PB-16	11	643.344	
	PC- 2	12	610.892	
	PC-25	13	474.128	
	PC-17	14	463.072	
	PC-10	15	398.944	
	PC-14	16	360.432	
	PC- 6	17	331.024	
	PC- 9	18	275.296	
	PC-19	19	162.016	
	PC-13	20	148.368	
	PD-11	21		102.432
	PB- 9	22		1,048.032
	PC-21	23		1,188.880
	PC- 7	24		1,351.424
	PC-22	25		2,206.304
	PC-18	26		11,066.752
GROUP D	PD-12	8	789.280	
	PD- 3	9	598.544	
	PD- 7	10	459.984	
	PC- 4	11	437.952	
	PD-23	12	73.888	
	PD-14	13		322.064
	PD- 4	14		361.888
	PD-15	15		805.184
	PD-13	16		1,129.296
	PD-10	17		1,294.304
	PD- 1	18		1,376.880
	PD-20	19		2,739.760
	PD- 9	20		8,347.888

No December Report: PA-9; PB-8; PC-15; PD-21.
Withdrawn: PC-5.

◆ ANNOUNCEMENT has recently been made that the Twenty-Second Annual Safety Congress of the National Safety Council will be held in Chicago, October 2 to 6, 1933. As in previous years, the Stevens Hotel will be Congress headquarters. This hotel, overlooking the Century of Progress Exposition, will give the delegates the privilege of being situated near this tremendous attraction. Because of the Exposition, those who expect to attend the Congress are urged to place hotel reservations *now*.

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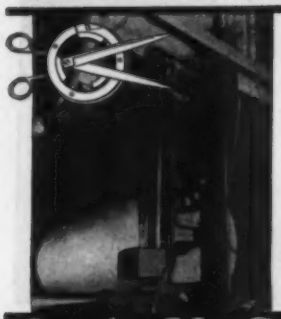

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WANTED—Largest producer of chromium-nickel alloy castings for sulphite industry desires services of sales engineering organization to act as representatives in Maine and New Hampshire. Must be well acquainted with sulphite producers in territory named. Address Box 207, The Paper Industry.

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THE PAPER INDUSTRY

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◆ New Investigations of Pulp Mill Wastes

The department of Chemistry and Chemical Engineering of the University of Washington is engaged in organizing an extensive program of research dealing with the utilization of the waste liquor of the sulphite pulp mills. This liquor contains in soluble form about one half of the wood used in making pulp, and at present is not utilized in industry. It is estimated that over two million tons of wood are washed into rivers and watercourses in the United States annually.

While in the East last year, Dr. H. K. Benson had requested the detail of several scientists from governmental laboratories to the University of Washington to work on the utilization of this waste at the beginning of this year. The contraction of work on account of the economic program made it necessary to abandon this part of the research. However, through the aid of advanced students and assistants, the University has started the work of its own accord. Dr Kenneth A. Kobe is conducting an experimental study of evaporation by submerged combustion which promises to greatly reduce corrosion and scaleforming in the usual type of evaporators. He is assisted by Frank H. Conrad and Frank C. Rogers. Dr. Benson has been interested in analytical methods for the determination of lignin, one of the main constituents in the waste liquor, and has been assisted in these studies by O. K. Chapman and J. R. Hendrickson. The work of the latter will be submitted at the June meeting of the Technical Association of the Pulp and Paper Industry as a tentative method for official use by the pulp testing committee.

Two new lines of work are being taken up at the beginning of the present quarter. Working under a grant of the National Research Council of Washington, D. C., Dr. Benson will be provided with the assistance of A. M. Partansky, a graduate student, to make a study of the biochemical decomposition of sulphite waste. In this investigation staff members of the Bacteriology department will also assist. It will extend over a full year and its object will be to study the rate of disappearance of organic matter in marine sediments.

Another new study will be undertaken by R. P. Erwin, a senior in Science, who will make a study of the tanning value of the waste liquor. This study will be undertaken by actual tanning and leathermaking experiments.

It is expected that with improvement of financial conditions in industry, the latter will contribute one or two scientists in this investigation and under more favorable conditions, the co-operation of governmental laboratories is probable.

In his recent book on *Chemical Utilization of Wood*, Dr. Benson reviews this whole problem quite fully and assures the reader that this problem is not unsolvable in this country if the procedure of other countries is recognized and if the methods of utilization be rightly coördinated with each mill attempting such a program. Dr. Benson's book is published by the National Committee on Wood Utilization, U. S. Department of Commerce.

◆ Plan Suggested to Test and Grade Casein for Paper-Coating Quality

Manufacturers and users of paper-coating casein attended a conference at the U. S. Department of Agriculture January 13 at the invitation of O. E. Reed, Chief of the Bureau of Dairy Industry, to consider suggestions for establishing a scheme of grading casein according to its paper-coating quality. The suggestions were based on the results of research during the past three years in which the dairy scientists, in co-operation with the Bureau of Standards, correlated the characteristics of finished paper coatings, the properties of coating mixtures, tests and analysis of caseins, and processes of casein manufacture.

The Bureau of Dairy Industry has interested itself in the problems of the casein industry primarily to bring about an increase in the production and use of domestic casein and thereby to enlarge the outlet for dairy products. By far the greater part of the casein used in the United States is utilized by the paper manufacturing industry for coating fine printing paper.

Dr. R. W. Bell, who is in charge of the bureau's division

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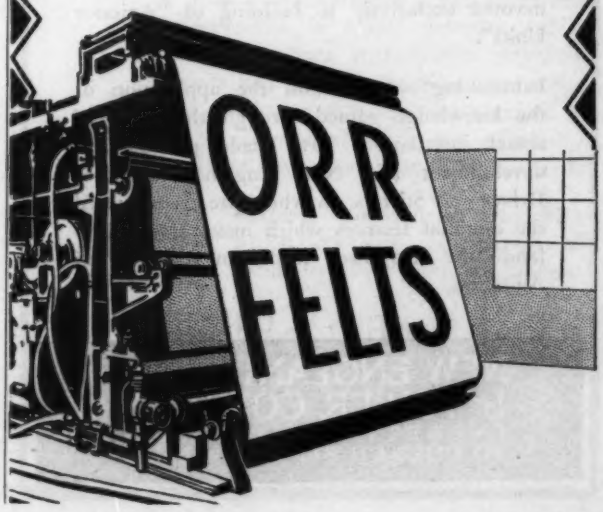

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of dairy manufacturing and introduction work, expressed the hope that the results of this research would enable the casein industry to establish an effective method of grading casein so that the makers could receive prices for their products commensurate with quality. When this happens, he said, much progress will have been made toward improving the quality of domestic casein so that it can compete more successfully with imported casein than it has in the past.

◆ Decision Raises Value of Imported Pulp Fifty Per Cent

The monthly bulletin of the Import Committee of the American Paper Industry reports a decision involving the undervaluation of M. G. narrow ribbed kraft wrapping paper shipped through a gulf port. The United States Customs Court held the correct dutiable value to be over $100 per ton, while the importer endeavored to secure its admission at a duty rate of 30 per cent on a value of $67.50 per ton.

During December, according to Warren B. Bullock, manager of the Committee, Customs officials found misclassification or undervaluation on shipments of various papers valued at about $100,000. Included in the shipments on which the duty rate was advanced were twenty-six shipments of writing or hand made papers, thirteen of bristol which the importers claimed to be cardboard, twenty-four shipments of fancy and glazed papers, nine of imitation handmade book papers, and a dozen kraft wrapping paper shipments which were held to be undervalued.

◆ John Calder Leaves Wrenn

John Calder, superintendent of the Wrenn Blotting Paper Company, Middletown, Ohio, has resigned. Mr. Calder plans to take a rather extensive vacation and has not announced any further plans.

Mr. Calder has spent practically all his life in paper mills. His early experience was in paper mills in Scotland. He had been with the Wrenn Blotting Paper Company for more than 20 years.

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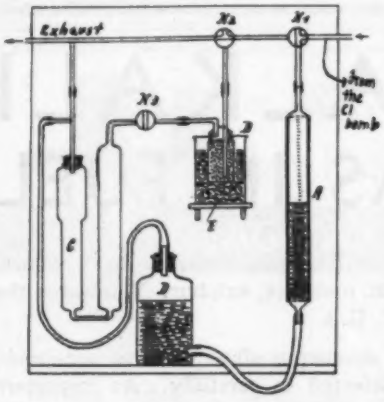
TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press and in the patent offices. Photostats and translations of complete articles and patents can be obtained at cost price.

IN THE PAPER INDUSTRY ■ DOMESTIC AND FOREIGN

◆ Bleachability of Wood Pulp

A standard method has been worked out by Swedish paper chemists for determining the degree of digestion or the bleachability of wood pulp which will also be of interest to American paper chemists. The first prerequisite is proper preparation of the sample of pulp which must be completely defiberized. Chlorine gas was used in experiments to determine a most satisfactory method. The apparatus used for this purpose is shown in the accompanying illustration. The sample of pulp is filled into the reaction vessel (B) and sprayed with boiling hot water from a wash bottle until the weight has increased 2.5 grams. The sample was cooled to 20 degrees C. and then the ground-in-stopper of the flask (B) was replaced and the flask set in the apparatus. The stopcock (K_2) is adjusted for a moment so that atmospheric pressure is attained in (B). The



stopcock is then closed and chlorine gas is sucked into (B) from the burette (A). The sealing liquid in (D) is always saturated with chlorine and consists of a chloride of calcium solution (30 grams per 100 cc. water). After first reading the level of the liquid in (A) the chlorine gas is driven over into (B) by raising the bottle (D) and suitably adjusting the stockcocks (K_1, K_2, K_3). The air in (B) is thus displaced and forced over into (C). The position of (D) is then so chosen that atmospheric pressure exists in the entire system. As chlorine gas is absorbed, the bottle (D) must be raised. After exactly fifteen minutes (D) is again lowered, so that the liquid seal in (C) fills the entire right leg of the U-tube as at the beginning of the analysis. Then the stopcock (K_3) is closed and the gas volume is read. A formula is given for the calculation of the chlorine number.

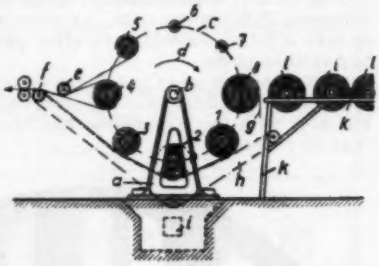
The article also contains a detailed description of the potassium permanganate method which was worked out by the commission and which is claimed to have many advantages over the other methods used for the same purpose. It is pointed out that the permanganate method has the disadvantage of all indirect methods for the determination of the degree of digestion of pulp; namely, that the result obtained by the addition of a definite quantity of potassium permanganate to the pulp depends on the reaction temperature, the duration of reaction, etc. These conditions must first be firmly established before the method can be used. It is claimed that the chlorine gas method does not afford as great possibility for differentiating between different types of pulp as does the permanganate method. The following coefficients (chlorine) have been set up as the limiting ranges for a number of pulps: — sulphite cellulose, easy-bleaching, 2.5 to 3.0; bleachable 3 to 5; moderately bleachable 5 to 8; hard 8 to 12; sulphate pulp, easy-bleaching about 2; bleachable 2 to 4; kraft pulp 4 to 8. The chlorine coefficients, which were obtained in this manner, agree very well with the content of lignin in the pulp. A table is also given comparing the chlorine coefficients with the permanganate numbers of sulphite pulp and sulphate. Svensk Pappers-Tidning, 1932, numbers 14 to 17.

◆ Sulphite Pulp Manufacture

It is difficult to understand why only the free acids are soluble in the solid phase, and not the salts of the acids, because it is known that the salts of the dissolved lignosulphonic acids are just as soluble as the acids themselves. The solid lignosulphonic acids have properties, which are very much like those of the permutits since the cations are easily interchanged. Hence there must be an equilibrium between the activity of the cations in solution and the quantity ratio of the cations in the solid phase. Hence we have $LH + Na^+ \rightleftarrows LNa + H^+$. (L) stands for the solid lignosulphonic acids. Experiments on raw sugar inversion in the presence of non-saturated lignosulphonic acids (LH) have proven, that these acids have a strong catalytic influence on the hydrolytic process. This result leads to the conclusion, that the dissolving-out of the lignosulphonic acids with the co-action of their hydrogen ions is accomplished by hydrolytic action. It is established by measuring the hydrogen ion concentration of the solution, when suspensions of pulp in water are heated with free lignosulphonic acids at 80 and 90 degrees C., that the speed of reaction at any moment is proportional to the lignosulphonic acids in the solid phase. The ratio of the constants at 90 and 80 degrees C. is calculated as 1.86, using average figures for these constants. This high temperature coefficient indicates that a chemical reaction takes place and not solution or diffusion. E. Haeggłund. Svensk Kemisk Tidskrift, volume 44, 1932, pages 163 to 169.

◆ Multiple Paper Cutter

This patent is concerned with an apparatus, shown in accompanying illustration, which cuts several paper webs as they are fed to it from a number of paper rolls. The feed of the webs is continuous, so that any interruption in the operation of the apparatus due to introducing fresh paper rolls is actually



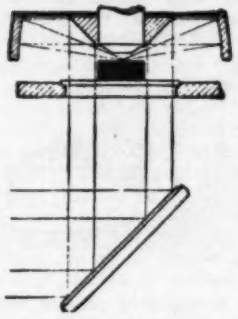
avoided. A revolving frame (c) is fastened to the shaft (b) which is supported on the pedestal (a). The frame (c) carries bearings on which eight or more paper rolls can be supported. The frame (c) can be fastened tight by means of latches, brakes and the like at any position. It rotates only in the direction of the arrow (d) when it is free. Of the rolls (1) to (8) on the frame (c), rolls (1) to (5) are unrolled one after the other in such a manner that roll (1) is unwound least and roll (5) is unwound most. All the paper rolls are unwound clockwise. The paper webs are carried through the guide rollers (e) and (f), and joined together one over the other so they can be led away in such form to the cutters, which may cut the webs lengthwise or crosswise. While the paper rolls (1) to (5) are being unrolled, a fresh paper roll can be placed on the frame (c) in the position (8). The end of the web on paper roll (8) first hangs down. Then as the frame (c) is moved, it is caught between an endless felt, which is under weight tension and it is united with the circumference of the paper roll (1), with the result that the roll (8) commences to unwind. The paper web (g) is carried between the rollers (1), (2) and (3) on the one hand, and the endless felt (h) on the other hand, and

then further between the paper webs which are unwinding from the rolls (1), (2) and 3.

In order to be able to fasten a fresh paper roll in the position (8) on the frame (c), the paper rolls (1) are arranged on a stand (k) at a suitable height so that the rolls can be easily moved from the stand to the frame (c). J. M. Voith, Heidenheim, Germany. German Patent No. 554,866.

◆ Microscopic Examination of Paper Structure

Certain conditions must be observed in examining paper structure under the microscope. For example, the rays of light must strike the surface of the paper at as flat an angle as possible. Otherwise disturbing shadows are obtained. A dark filed condenser, as shown



in figure 1, must be used, so that the rays of light strike the paper, which is a unicolored object, to bring out in clearest manner the shades and shadows in the paper. A new instrument has been developed wherein all the essential features are contained in a single device. This is known as the Busch univertor. Details are given of the construction and operation of this instrument, which is claimed to go far in simplifying and increasing the accuracy of microscopic examination of paper structure. Dr. Karl Albrecht. Der Papier-Fabrikant, 1932, volume 30, pages 473 to 475.

◆ Reddening of Sulphite Pulp

Observations in pulp mills, extending over several years, have led to certain interesting conclusions on the phenomenon of reddening of sulphite pulp. The reddening was determined in the following manner: Strips of paper and pulp were dipped into 1.5 per cent solution of hydrogen peroxide for twenty seconds and then these strips were laid on a white board and allowed to remain there for another twenty minutes at a room temperature of 19 degrees C. without change of air or draft. The red color was compared with standard colored red glass. Neither a change in the compositions of the digestion liquor and in the time of digestion (with the degree of digestion remaining constant), nor a more or less thorough washing process or the color of the waste liquor made any essential difference in the tendency of the pulp to redden. The only way in which to mitigate this action is to change the degree of digestion of the pulp and digest softer stock. The thicker the paper (in the case of parchmentized paper), the stronger the reddening. According to experiment particles of iron in the digestion acid, the pulp and the factory water have no influence on the reddening phenomenon. The nature of the wood used, floated or not-floated, aged or fresh, is of no moment. The addition of alum to the beater has a marked effect in enhancing the reddening, while the addition of soda markedly reduces the reddening, but it makes the pulp yellow. The reddening of parchmentized paper generally corresponds in intensity to that of the same phenomenon in the pulp from which the paper is made. It appears to be impossible in practical operation to avoid the tendency of reddening in hard stock. Partial aid is afforded only by the addition of certain cheap chemicals; for example, thiosulphate or hydrosulphite. These chemicals are potent in reducing the tendency of the pulp to redden, but at the same time they give it a grayish yellow color. H. Alfthan. Papp. och. Traevarudtisckrift for Finland, volume 13, page 1068ff.

◆ Digestion of Wood

Wood chips and other material containing cellulose, such as straw, are mixed with digestion liquor, which may be sodium hydroxide, calcium bisulphite, or sodium sulphide mixed with sodium hydroxide. The mixture of wood and liquor is pumped continuously through a pipe or coil maintained at the required cooking temperature and of such length that the material during its passage is digested to the desired degree. An apparatus is also described. British Celanese, Ltd. British Patent No. 378,-722, filed November 16, 1931.

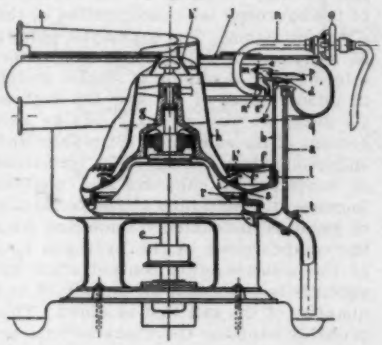
◆ Surface of Newsprint

The surface of a good grade of newsprint must allow as little wear on the type material during printing as possible. A simple apparatus has been constructed in a Norwegian paper mill for testing the wearing action of the surface of newsprint on type metal. A pencil of definite composition (red lead and one to two per cent solid paraffin) moves over the surface of the paper. The pressure of the pencil against the paper surface is partly controlled by means of a spiral spring, the surface of the pencil being one square centimeter. The pencil moves lengthwise and crosswise over the paper, the total surface covered being 720 sq. cm. The paper is placed on a glass plate and the pencil is weighed with a weight to give constant pressure. When the pressure of the pencil against the paper surface is constant and the surface covered is also constant, then the character of the surface will cause different wear on the material of the pencil. The amount of material worn off the pencil is determined in milligrams by weighing before and after the test. The results obtained are found to agree well with those in actual practice. A small electric motor is used to move the pencil over the surface of the paper in order to avoid the error that arises when it is moved by hand. S. Samuelsen and Stephansen. Papir-Journalen, volume 19, pages 193ff.

◆ Centrifugal Purifier for Pulp

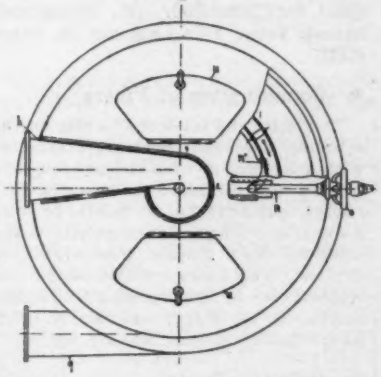
Both heavy and light impurities are removed from paper pulp by this machine. It is shown in section in Figure 1 and in top view in Figure 2. The casing of the purifier, the driving shaft (c) and the drive are made in the usual manner. The bowl for receiving the stock to be purified is composed of a

Fig. 1



hub (g) of suitable shape on which is fixed a circular shell (b) on which is mounted the separating device (d-e). At the lower end is a grating (f) for carrying away the stock and concentrically

Fig. 2



with the hub (g) a distributor (h). The cover (j) carries an inlet conduit (k) which terminates in a spiral to give the pulp a circular motion. Under this action, the pulp falls against the walls of the distributor (h) which give to it their speed of rotation and throw it against the circular baffle (i). The shock causes the pulp to disintegrate and the impurities are freed from the fibers. Centrifugal force forces the pulp into (1) from which it rises between the fingers of the grating (f). The pulp is caused to remain in (1) as long as possible so that the heavier impurities can settle. The pulp then passes through the separator, wherein the lighter impurities

are removed. Georges Grauss. French Patent No. 733,616.

◆ Studies of Sulphite Liquor

This particular investigation was concerned with the changes that take place in the acidity of sulphurous acid solutions at high temperatures through the addition of salt. The addition of sodium sulphate to a solution of sulphur dioxide results in a normal digestion of wood at a temperature of 135 degrees C. However, digestion with sulphur dioxide alone and with sulphur dioxide mixed with sodium chloride was found impossible. The favorable action of sodium sulphate on the sulphur dioxide digestion of wood depends on the reduction of the hydrogen ion concentration of the digestion liquor. The hydrolytic powers of solutions of sulphurous acid, determined by the inversion of soluble starch at temperatures of 110 and 120 degrees C., depends very strongly on the salt content of the solutions. Bisulphite and sulphate reduce the speed of formation of sugar, while chlorides and nitrates increase it. Inasmuch as the formation of sugar is undoubtedly connected with the concentration of the hydrogen ions of the solution, this concentration apparently is dependent on the nature and quantity of the salt that is added. This probably explains the characteristic action of sodium sulphate in the digestion of wood with the aid of sulphurous acid. Furthermore, orientating experiments on the speed of the inversion of raw sugar with solutions of sulphurous acid alone and also in the presence of sodium sulphate have proven that the addition of sulphate to the digestion liquor causes a considerable decrease in the speed of inversion. E. Haegglund. Svensk Papp. Tidn., volume 34, pages 838ff.

◆ Comminution of Fibers

To reduce the tendency to slip on the grinding rolls, the fibers are pretreated with a natural or artificial aqueous dispersion of vulcanized or unvulcanized rubber, gutta-percha, or balata, or with a solution or dispersion of gelatin, resin, cellulose ester. glucose, gum arabic, or dextrin. The fibers are then dried at a temperature of 150 degrees C. P. Schidrowitz, R. M. Ungar and M. W. Philpott. British Patent No. 379,099.

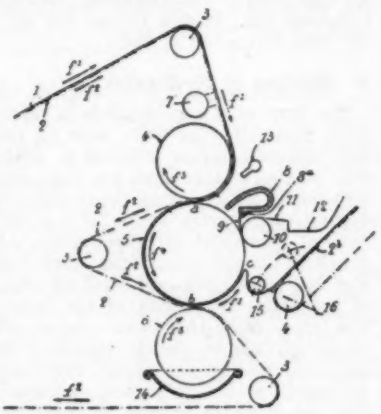
◆ Coloring Paper

Easily-mottled colors are obtained, as is well-known, when coloring paper pulp and the like with the aid of basic, substantive and similar dyestuffs. This cannot be avoided in any practical manner when such dyestuffs are used and even when the directions of the manufacturers are followed out in the last detail. The new discovery is that paper, pulp and the like can be colored with basic, substantive and similar colors without any mottling or smearing, and that a uniformly colored paper can be obtained in finest quality, when various substances are added to the paper stock during its processing or to the paper itself before the color is added or simultaneously therewith. These substances are synthetic mordants, particularly condensation products of aromatic sulphonic acids with formaldehyde. After the mordant has been thoroughly worked in with the stock, the latter is processed in the usual manner.

For example, one-half to one per cent of the sodium salt of the condensation product of betanaphthalenesulphonic acid and formaldehyde is added to the stock in the beater. This mordant is first dissolved in water and the solution rendered neutral with sodium bisulphate. Then the stock is dyed to shade with the usual paper dyestuffs and thereafter sized in the usual manner. I. G. Farbenindustrie A. G., Frankfurt-am-Main, Germany. German Patent No. 555,033.

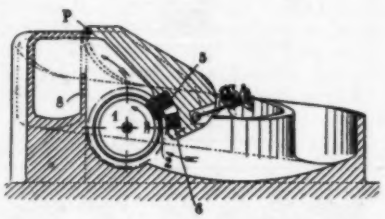
◆ Drying Paper and Pulp

The apparatus devised for this purpose is shown in illustration. The web (1) to be dried may be pulp, paper, cardboard, etc., moist or impregnated with any substance. It is carried by an endless felt (2) which moves in the direction of the arrows (f_2). The felt turns around the roller (3). The pressure-applying device is constituted of three cylinders, superposed one over the other and in contact with one another, at (4, 5, 6). The felt (2) moves between them and contact is made with the moist web at (a) and (b). The cylinders may be made of wood, cast iron, steel, bronze, etc., and may have a jacket of different material, such as copper, brass, rubber, etc. They may be solid or hollow, heated or cooled. Suction may be applied to them internally. In the case shown in figure 1, cylinders (4) and (6) are covered with felt, while cylinder (5) is naked. At the right of the cylinder (5) is seen an arrangement for detaining the water removed from the web and for preventing at the same time the winding of the web (1) around the cylinder (5). This consists of a metallic element (8) which oscillates about the axis (8^a), the weight of (8) assuring a suitable pressure of the doctor or scraper (9) against the surface of the cylinder (5). This pressure can also be secured by means of levers or springs. The metallic element (8) has one or more openings through which the liquid, which is removed at (a) is sucked through, as the web and felt pass between the cylinders (4) and (5). The hollow portion of the element (8) forms an aspirating collecting chamber and is connected with a suction pump or the like. The operation of the arrangement illustrated, as well as that in three other examples, is explained in great detail. Antoine F. Valentin. French Patent No. 733,105.



◆ Beater With Movable Bedplate

The beater roll (1), which is provided with knives (2), is driven in some suitable fashion; for example by direct coupling with the driving motor. The bedplate (5, 6), which is hung on the axis (P) so that it can be moved or swung easily from side to side. The feature of the invention lies in the fact that the movable bedplate has such a position with respect to the axis of rotation (P), that the friction surface



of the bedplate is pressed against the surface of the beater roll under the influence of the weight of the bedplate and its support. This is accomplished in such fashion that the bedplate always remains parallel to the circumference of the beater roll and accordingly wears uniformly at all points. In order to accomplish this, the axis (P) of the bedplate lies on or in the immediate neighborhood of the vertical line right angles to the radius of the roll which passes through the middle of the arc of the bedplate. This perpendicular line lies between the middle of the roll and the arc of the bedplate at a distance from the center of the beater roll, which corresponds to half the separation of the beater roll and the bedplate caused by the wear on the latter. The bearing point (P) of the bedplate is adjustable on sliding rails or on an eccentric or other suitable arrangement. The backfall, over which the stock is centrifuged into the return flow channel, consists of a wall (8), which is arranged vertically or almost so on a plane horizontal to the axis of the beater roll. Edouard Hery. German Patent No. 556,122.

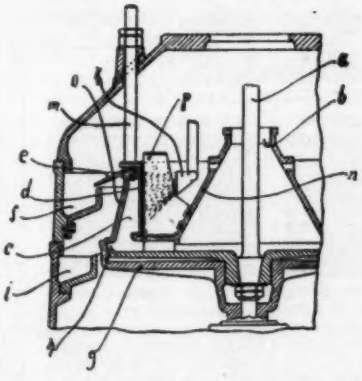
◆ Strawboard From Straw

The objectionable nature of the effluent, which is produced during the manufacture of strawboard from straw by treatment with lime, is due to the sulphur compounds in the straw. The sulphur may be determined by heating the straw with reduced iron, treating the residue with hydrochloric acid and absorbing the evolved sulphuretted hydrogen in aqueous solution of sodium hydroxide. A sample of the straw con-

tained 0.25 per cent of sulphur, and one of strawboard made from it only about 0.1 per cent. The pH of a straw-water mixture falls within two to three days from 6.4 to 5.2, and thereafter it remains nearly constant, although increasing quantities of sulphuretted hydrogen are evolved. If the pH is maintained constant by the addition of sodium hydroxide at 7.0 to 7.6 for two to three weeks, much more sulphur, organic and inorganic nitrogen, and other substances are removed from the straw, which is unchanged in appearance and may be used satisfactorily for the manufacture of strawboard. The effluent from the process is much less objectionable than when raw straw is used. The liquor from the sodium hydroxide treatment should be of value as a fertilizer. Lime hydrate may be used in commercial practice. H. Bach. Chemiker Zeitung, 1932, volume 56, pages 701 to 703.

◆ Purifying Stock Mixture

The machine used for this purpose is shown in the accompanying illustration and is of the centrifugal type. The mixture of stock and water enters through the tube (b) which is concentric with the shaft (a) and reaches the centrifuging chamber (c), and leaves the machine through the perforated cylinder (d) over the edge (e) through the channel (f). When the plate (g) is lowered, the slot (h), which is located in the outer wall of the rotor (o), is opened, with the result that the entire contents of the centrifuging chamber (c) can be removed through the channel (i). Fresh water is advantageously added during the purification process through the nozzle (k). This serves to remove knots which may close the slots or per-



foration in the wall (d). The perforated cylinder (d) does not rotate with the rotor (o). It is suspended on the bolts (m) and can be moved; furthermore, it can be joined liquid-tight against the rotor (o). The cleaning-out paddles (p) are fastened to the middle part (n) of the rotor (o), and these paddles lift over the top edge the water which passes through the perforated wall (d). Pressure elements are arranged on the paddles (p) in such a manner that their position can be adjusted. These pressure elements press outwards against the perforated wall (d) as they rotate and thus exert a suction and presure effect on the liquid in the centrifuging chamber (c). Hundt & Weber G.m.b.H., Geisweid, Germany. German Patent No. 555,743.

◆ Purifying Sulphite Waste Liquor

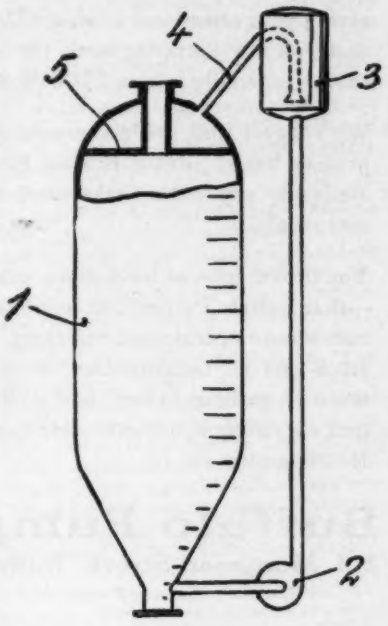
The inorganic and organic substances, which are contained in sulphite waste liquor, are separated by precipitation with lime and are obtained in solid form. The precipitating agent is added to the sulphite waste liquor only in sufficient proportion to cause the precipitation of a flocculent yellow mass, which consists mainly of calcium monosulphite and of lignin. The separation of the precipitate from the liquor is easy. The liquor is then treated with additional lime (in certain cases in several stages) until almost all the lignin has been precipitated from the liquor. The precipitate is then removed. The claim is that the new process allows more complete removal of the lignin than any other hitherto known or used. Furthermore, this result is attained with minimum consumption of the precipitating agent, lime. An additional economy in this process is that the lignin, that is removed from the waste liquor in the afore described manner and which contains appreciable quantities of lime, can be used as the precipitating agent for the inorganic substances in the first stage of the process. German Patent No. 554,748.

◆ Analysis of Paper

A study has been made of the analysis of paper by the Halse method. It is pointed out that when this method is employed, the content of lignin in the chemical and mechanical pulp should be determined separately. Due to the effect of the loss of fibers from the white water system in paper mills, the content of lignin found for mechanical pulp should be reduced by 0.2 per cent to obtain the absolute percentage. When circumstances do not allow the separate determination of the lignin content of the raw materials, an average of 2.4 per cent lignin in ordinary unbleached sulphite pulp and 25.5 per cent lignin in mechanical wood from spruce have been found satisfactory assumptions. In the case of sized paper both the paper and the raw materials are first extracted with ether. In the case of paper containing fillers, the loss of filler on ignition must be known. The method is described in detail in the original article in which tabulated results and formulae for making calculations are also given. C. Anker, K. Haug and Erik Stephansen. Papir Journalen, volume 20, 1932, pages 251 to 254.

◆ Treating Pulp or Wood Chips

Pulp is treated with wash liquor or wood chips with digestion liquor in the apparatus shown. The common process consists in filling the material into a digester or the like and feeding the liquor into the same and then removing it, with the result that the stock is brought in and out of contact alternately with the entire quantity of digestion liquor. However, according to the new process, the digestion liquor or wash liquor is added to the apparatus, a closed container, at intervals in partial flow, so that the pulp or wood chips are irrigated with a portion of the liquor at certain time intervals. The advantage of this process is that superimposed layers of the woodchips and pulp alternately come in and out of contact with the treating liquor. The partial flow of liquor through the mass of material in



the apparatus comes into contact with each layer of pulp or wood chips and exerts a certain pressure thereon.

This process can well be carried out with a single digester. The digester is shown at (1), the circulating pump at (2) and the collecting tank at (3), which is provided with the usual siphon arrangement (4). When the liquor attains a certain height in the collecting tank, which corresponds to the highest point in the siphon, the container is quickly emptied through the siphon tube and the stock in the digester (1) is irrigated with the liquor through the distributing plate (5). After the collecting tank has been emptied through the siphon tube (4), the flow of liquor is automatically stopped by the break in the vacuum, and it is not resumed until the collecting tank fills again with liquor. Einar Moretrud, Torderoed pr. Moss, Norway. German Patent No. 556,837.

◆ ◆ ◆

◆ THE BROWN Instrument Co., Philadelphia, has appointed O. B. Wilson, formerly manager of its Cleveland office, as district manager of the territory comprising Texas, Louisiana and Southern Arkansas, with headquarters at Houston, Tex.

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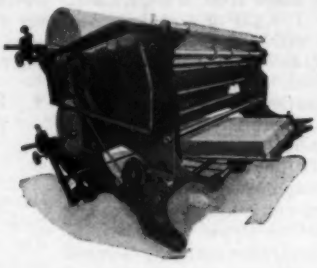

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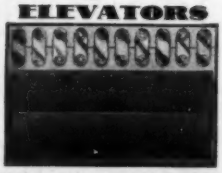

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The COMMERCIAL OUTLOOK

New York, February 1, 1933.

DISAPPOINTING indeed to those within the industry has been the paper market situation thus far in 1933. Not only hasn't the market developed the usual seasonal improvement ordinarily witnessed following the holiday and inventory lull, but matters from the point of view of the demand arising for the various grades of paper and board from the thousand and one consuming quarters have figuratively gone from bad to worse, and it is not going too far to state that the condition at present is even more unfavorable and disconcerting than has been known at any time during the last couple of years of extreme difficulties for paper manufacturers and distributors.

It is very apparent that the distressing market situation in paper and board is due to the general business and economic condition, and not to any causes within the paper manufacturing industry itself. As a matter of fact, paper prices are today on more attractive levels than perhaps any consumer or buyer of the present generation has ever seen, but this is not prompting consumers or converters to buy. Only one factor is dictating the course of buyers' operations at this time, and that factor is necessity; it is next to impossible to induce the customer of any paper mill or paper dealer to take in supplies unless the need is definite or unless he is reasonably sure he is going to need the paper.

This buying attitude, unfortunate as it is, coupled with the fact which is acknowledged on all sides and requires no additional proof that paper consumption is running far under anything approaching normal—and from immediate indications is undergoing further contraction—are at the bottom of the very restricted consuming outlet for paper. Moreover, it is generally understood and openly admitted that activity in the paper market will not expand until the general business situation registers definite and substantial improvement. So many lines of manufacturing and trade; in fact, it can well be asserted practically every branch of business, are so seriously affected by the depression that production in all directions has been sadly diminished, and in nearly every quarter where paper is consumed or converted, requirements have decreased to a degree where buyers have curtailed their purchases to a marked extent.

This, however, does not mean that the paper industry is reduced to the depths of despair. Judging from statistics, the paper manufacturing industry is operating on a higher percentage basis than is probably any other of the important basic manufacturing industries of the country. This is poor consolation, to be sure, because consumption of and demand for paper has dropped to a sufficient amount to make for a most unfavorable and unsatisfactory situation, yet there is a feeling of confidence within the industry which is frequently asserting itself, and the common belief is that the depression is at last at the very bottom and that brighter days are ahead. How the improvement that is expected will develop, when it will come and what length of time will be required to put business back on its feet and on the route to better things are subjects which few or none in the trade are willing to hazard guesses, but that the condition will not long remain as doleful as it is now is an opinion freely and openly expressed by various authorities in the industry.

One of the unfortunate features of the prevailing situation is that paper manufacturers and distributors are competing keenly for business; seemingly more so than in normal times. The result obviously is that prices of paper are being shattered; despite the efforts of some in the trade to sustain market levels, prices are repeatedly receding to the chagrin of those within the industry. In some cases as regards certain classes of paper, it is anybody's guess what actually constitutes market prices since market levels are changing so frequently and in some instances to so drastic an extent. What is aptly described as a "chaotic" condition exists in paper prices; in fact, it would seem as if this is the only word accurately fitting the case. But, as some in the industry point out, it is hoped that those in the trade will soon come to the realization that lower prices have absolutely no influence in stimulating consuming demand in these times, and that the wild scramble of price cutting will be brought to a termination.

Production of newsprint in the United States in December amounted to 80,075 tons and shipments from mills to 79,002 tons, comparing with 81,662 tons produced and 83,922 tons shipped in the preceding month, according to the News Print Service Bureau. Canadian output in December was 138,682 tons and shipments were 140,770 tons, against 161,334 tons and 164,327 tons respectively in the preceding month, making a total United States and Canadian production of 218,757 tons and shipments of 219,772 tons, contrasted with 242,996 tons manufactured and 248,249 tons shipped in November. During December 21,704 tons of newsprint were made in Newfoundland and 902 tons in Mexico, so that the total North American production for the month amounted to 241,363 tons, against 265,035 tons in the preceding month.

Newsprint production in the United States during the entire year of 1932 totaled 1,006,569 tons, comparing with 1,157,436 tons in 1931, a reduction of 13 per cent. The Canadian output reached 1,907,566 tons last year, against 2,221,454 tons in 1931, a decline of 14.1 per cent, while the decline in Newfoundland production for the year was 7.9 per cent, and in the Mexican output 16.5 per cent. The total North American production reached 3,198,622 tons in 1932, a decrease of 490,446 tons, or 13.3 per cent from the 3,689,068 tons produced in 1931.

Stocks of newsprint at U. S. and Canadian mills at the end of 1932 amounted to 64,120 tons, contrasted with 86,913 tons on December 31, 1931. Stocks at U. S. mills were 21,783 tons, against 32,709 tons, and at Canadian mills 42,337 tons, against 54,204 tons.

Production of paperboard decreased in November compared with the preceding month, mills in the United States manufacturing a total of 179,094 tons in November, against 201,777 tons in October last and 186,776 tons in November, 1931, according to the monthly summary of the U. S. Department of Commerce. The eleven-month output last year aggregated 1,994,688 tons, contrasted with 2,393,312 tons in the similar time of 1931, and 2,523,112 tons in 1930. Board mills received orders calling for 163,128 tons of board during November, against 199,119 tons in October, and had unfilled orders at the end of November for 33,575 tons, compared with 48,536 tons a month before. Shipments of board from mills during November totaled 178,189 tons, compared with 203,932 tons in the preceding month, and stocks on hand at mills at the end of November amounted to 72,491 tons, contrasted with 72,083 tons a month previously.

Some price concessions in newsprint are reported, mills in certain instances accepting orders at rates below the announced contract basis now in effect. Fine paper manufacturers are reported exerting effort to keep prices of their product on something resembling a stabilized level, yet buyers are said to be accomplishing purchases at shaded prices. Wrapping paper is very unsettled in price, and tissue is quotably easy. Some manufacturers are shading book paper prices, and most paper specialties are very irregularly quoted. Board quotations are relatively steady, mills in the East naming $30 per ton on newsboard and $27.50 on plain chip for delivery in New York City.

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◆ Falk Appoints Connell Vice President

The Falk Corporation, Milwaukee, announces the appointment of Edward P. Connell as vice president.

Mr. Connell has been with the company since 1913. In 1924 he was made comptroller, which office he will retain in connection with his new appointment.

QUALITY is the common denominator of all DIAMOND ALKALIES . . . a quality that combines full strength, the highest commercial purity and positive uniformity from one end of the year to the other.

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Domestic RAW MATERIALS

◆ Papermaking Rags

Demand for rags for papermaking is exceedingly slow. It is evident that mills are not using anything approaching normal amounts of rags and that they are indisposed to absorb other than supplies for which they have actual need; the result is that the orders reaching the market seldom call for other than small quantities, and the aggregate of business in rags is light at best.

Packers and dealers, while retaining their confidence concerning the future of the market once matters from a general standpoint register improvement, are momentarily depressed if not discouraged. For months past they have endeavored to increase their sales and have met with so little or no success owing to the reluctant attitude of paper manufacturers to take in supplies except to satisfy urgent wants that they now are pursuing a rather waiting policy, feeling that just as soon as mill requirements expand, demand will automatically increase and that until then no effort on their part will serve to stimulate buying.

Some of the better grades of new cotton and linen cuttings are selling relatively well, but this statement bears qualification because most of the grades of old rags are in almost no demand, so that while some new cuttings from a comparative viewpoint are moving fairly freely, even sales of these are on a small tonnage scale. Writing and other fine paper mills appear, in a large majority of instances, to be using only new rags; indications are they have discontinued the consumption—at least for the present—of old white rags, thirds and blues and other old rags. Roofing stock is in fairly consistent call yet felt mills are purchasing in small volume. It can be said that the two extremes of papermaking rags—the best grades of new cuttings and the lowest qualities of old rags or roofing stock—are in most movement into consuming channels.

Prices are altogether in favor of those on the buying side of the market. True enough, some of the desired descriptions of new cotton cuttings are rather firmly quoted, owing in chief measure to the restricted available supplies in dealers' hands and the light production, but papermakers are experiencing no difficulty getting the rags wanted whenever they offer prices within reasonable bounds. New No. 1 white shirt cuttings are reported offered to mills at 3.75 to 4 cents a pound f.o.b. shipping points, unbleached muslins at 4.75 cents, light silesias at 3 to 3.25 cents, new blue overall cuttings at 3 to 3.25 cents, fancy shirt cuttings at 1.25 cents, No. 1 washables at a cent per pound to 1.10 cents, and new khaki cuttings at 3.25 to 3.50 cents.

Old No. 1 repacked whites are available at 2.50 cents to slightly higher, depending on the quality of the rags involved, while No. 2 repacked whites are approximately 1.75 cents at shipping points, repacked thirds and blues 90 cents to $1 per hundred pounds, twos and blues around 1.25 cents a pound, and miscellaneous thirds and blues 75 cents a hundred.

Eastern mills are buying No. 1 classification roofing rags at 42½ cents per hundred pounds f.o.b. dealers' points, and No. 2 stock at 32½ to 35 cents. Although demand for roofing rags is limited, mills are absorbing practically all the supply coming into view, and dealers assert there is almost no accumulation in packing circles. The opinion is openly expressed that any broadening of consuming demand for roofing stock would promote a quick strengthening of market prices.

◆ Rope and Bagging

Paper mill demand for old rope and bagging is slow. The leading purchasing agency is reported buying no old manila rope except from its regular suppliers, and other consumers are entering the market only in very spasmodic fashion. Prices of old rope are maintained at about 1.50 cents or a shade less f.o.b. shipping points for No. 1 domestic manila rope, and around 1.35 cents ex dock New York and other American Atlantic ports for No. 1 foreign old rope. Sisal rope and strings are selling fairly freely on a price level of a cent per pound to perhaps a little higher at shipping points. No. 1 old scrap bagging is quoted at around 65 cents per hundred pounds, and roofing bagging is selling at 30 cents to a shade more at dealers' points. Old gunny bagging for breaking up is priced at an average of 85 cents per hundred pounds f.o.b. shipping points.

◆ Pulpwood

A quiet market prevails for pulpwood, and quoted prices are irregular. Total exports of pulpwood from Canada in 1932 amounted to 529,019 cords, valued at $4,830,506, practically all of which came to the United States, compared with 957,303 cords of a value of $9,359,592 exported in 1931, according to official Canadian Government figures.

◆ Old Paper

High grades of old paper are reported in low available supply and bringing steady values in sales to paper and board mills. On the other hand, the low qualities of waste paper are in restricted demand and prices have reacted to cheaper levels in the East. The situation in the low grades is a reflection of curtailed manufacturing operations of box board mills, and there seems little likelihood of improvement until the board market changes for the better. Hard white shavings are reported selling in the East at 1.60 cents a pound for No. 1 packing f.o.b. shipping points, and No. 1 hard white envelope cuttings at 1.75 cents, while No. 1 soft white shavings are around 1.40 cents, and one-cut soft white shavings 1.60 cents. Books and magazines are priced at 50 to 55 cents a hundred for No. 1 heavy stock, and mixed ledgers at 50 cents. Folded news is available in eastern centers at 30 cents a hundred pounds at shipping points, and No. 1 old mixed paper at 12½ and 15 cents per hundred. Kraft papers have eased to where No. 1 old kraft is offered at 55 to 60 cents a hundred pounds, and new kraft cuttings at 1.20 cents a pound.

◆ Mechanical Pulp

It is apparent that foreign groundwood, that is, pulp imported from Scandinavian sources, is replacing Canadian and domestic pulp in many United States consuming quarters, with the result a narrow market outlet exists for domestic and Canadian mechanical pulp. The Canadians in some cases are pressing to sell, and it is stated purchases of prime groundwood are feasible in some instances at as low as $13 a ton f.o.b. grinding plants across the Canadian border, although quotations usually range from $14 to $15. Domestic groundwood is nominally around $18 a ton at pulp mills, with very little tonnage selling in the open market. Production of mechanical pulp in this country and in Canada is said to be undergoing additional curtailment to conform with the small outlet among consuming mills.

◆ Chemical Pulp

Not much activity is noted in the domestic chemical pulp market. There is a certain tonnage moving into contract channels, and, of course, occasional sales in the open market, but domestic producers are finding it difficult to compete with foreign pulp and in most cases are manufacturing only sufficient tonnage to supply their own needs. Prices are fairly steady of tone despite the slow market. Bleached sulphite of domestic prime quality is quoted at 2.10 cents a pound ex dock Atlantic seaboard, with buyers shading this price in some instances down to about 2 cents and perhaps at 1.90 cents. Unbleached sulphite of domestic origin is approximately 1.50 cents a pound at pulp mills, while bleached soda pulp is quoted at 2 cents per pound delivered book paper mills. Kraft pulp is on a wide quotable range of 1.25 to 1.60 cents at producing points.

◆ Chemicals

Contracting for 1933 supplies has about ended, and the market for papermaking chemicals has settled into a quiet state with producers making regular shipments on contract but experiencing a limited demand otherwise. Bleaching powder is 1.75 cents a pound at works, while caustic soda is quoted at 2.55 cents at works for the solid product, and soda ash at 1.30 cents for bag shipments.

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◆ THE ALUMNI of the New York State College of Forestry that are now associated with paper mills will meet for the annual alumni luncheon Feb. 14 in the Fraternities Club Bldg., New York.

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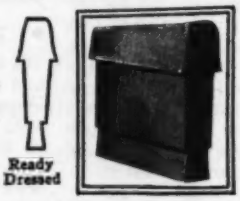

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Import and Export MARKETS

IMPORTS

◆ Wood Pulp

The market for imported wood pulp has not as yet revived from the usual slow period during the holidays and inventory season, and is in a quiet condition. Paper manufacturers, having encountered a slowing down of activity in their own markets, are manifesting little or no disposition to augment their pulp supplies or commitments, and are keeping very much in the background as buyers. There is, of course, some business developing in a more or less spotty manner, but demand is running along slim volume lines, and a rather waiting position characterizes the market.

Despite the contraction in pulp business, prices exhibit greater steadiness than in some while. Back of this price stability lie several factors which have been in process of materialization in recent months and which now are waging helpful influence on ruling market values of pulp. Producers in Europe have held a number of conferences during the last few months, the outcome of which has been agreements regarding pulp prices which are having steadying effect now that the foreign manufacturers are working together to establish market stability. Price concessions have been allowed American buyers of chemical wood pulp, as attested to specifically by the decrease in the quotational basis on prime kraft pulp to 1.25 cents a pound ex dock American Atlantic ports. The European producers have readjusted their selling prices of pulp on levels which they feel are in true line with existing conditions affecting the purchase and consumption of their product in the United States, and having concluded that pulp prices have been brought as low as believed advisable in view of production costs, etc., are now adhering firmly to the figures quoted, and their firm attitude in respect to prices is making for a decidedly steady market tone.

Prime bleached sulphite is quoted at 2.10 cents per pound ex dock Atlantic seaboard. It is possible for buyers to obtain some such pulp at slightly under this price level, transactions at 2 cents and even down to 1.90 cents having been reported, but strictly prime bleached sulphite is held at the 2.10-cent basis and shippers abroad evince little disposition to sell at less. Strong unbleached sulphite of prime grade is quoted at 1.60 cents ex dock American Atlantic ports, which price also is well sustained although occasions crop up now and then when purchases are made at a little below this level. Most often it is said, however, that the sulphite bought under 1.60 cents is not strictly prime in quality. Sulphate or kraft pulp of prime grade is 1.25 cents a pound ex dock, which price is firmly maintained, the statement being made in various corners of the trade that it is seriously questioned whether prime kraft can be bought at less. Foreign groundwood is steady of tone on a quotable basis of $17.50 to $18 per short ton ex dock American Atlantic ports, and producers abroad are said to be fairly well sold up for a time and are not pressing offerings to the American market.

Chemical pulp imports into the United States during November were comparatively heavy, as usually is the case at that time of the year when last open water shipments from Sweden commence to arrive in this country. The November importations, totaling 128,275 long tons of chemical pulp, valued at $4,431,850, according to U. S. Department of Commerce statistics, were larger than in any previous month last year with the exception of January and February, comparing with 106,824 long tons of a value of $3,956,281 in October, and 152,666 tons of a value of $6,276,181 in November, 1931. The November receipts brought the total for the first eleven months of 1932 up to 1,015,499 long tons, contrasted with 1,136,953 tons in the corresponding period of 1931.

Mechanical pulp imports in November amounted to 22,382 long tons, valued at $391,413, contrasted with 18,809 long tons of a value of $369,737 in the same month of 1931, and making a total for the first eleven months of 1932 of 152,422 long tons, valued at $2,970,138, against 167,767 tons of a value of $4,044,960 in the corresponding time of 1931.

◆ Paper

Imports of paper into the United States in November were valued at $7,561,242, according to U. S. Department of Commerce figures, comparing with receipts of a value of $7,371,339 in the preceding month, and $10,033,812 in the same month of 1931. During the first eleven months of 1932 paper imports were valued at an aggregate of $87,892,648, against $115,983,991 in the similar period of 1931. Newsprint comprised the bulk of these imports, the receipts of such paper in November last being valued at $6,828,860, against $9,312,752 in the same month of 1931.

◆ Paper Stock

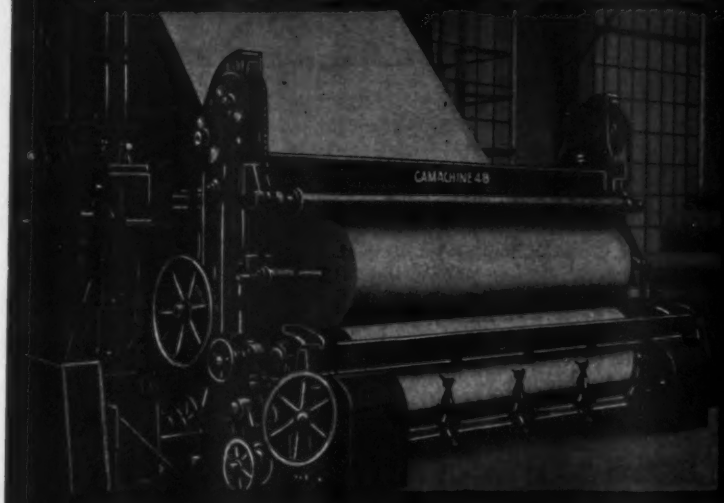
Imports of papermaking rags into the United States during November last were somewhat larger in point of quantity than in the preceding month, reaching a total of 10,894,277 pounds, valued at $105,779, compared with 7,386,391 pounds of a declared value of $110,696 in October, and making a total for the first eleven months of last year of 80,495,951 pounds of a value of $1,055,849, against 109,047,818 pounds of a value of $1,472,630 in the corresponding period of 1931. Importations of old rope, bagging, and miscellaneous paper stock during November amounted to 4,529,409 pounds, valued at $46,661, making a total for the first eleven months of last year of 78,917,620 pounds, valued at $717,721, contrasted with 104,555,746 pounds of a value of $1,408,432 in the similar time of the preceding year.

EXPORTS

The United States exports of paper continue to decline, from the standpoint of the value of shipments from this country. The exports in November last reached a total value of $1,110,067, showing a further decrease from the shipments of a value of $1,114,493 in the preceding month, and a larger decline compared with exports valued at $1,763,428 in November, 1931, according to U. S. Department of Commerce official statistics. The November exports brought the total for the first eleven months of last year up to $14,249,020, against $20,885,398 in the similar time of 1931.

Newsprint exports in November last amounted to 1,057,865 pounds of a value of $27,493, against 2,232,794 pounds of a value of $64,222 in the same month of 1931. Writing paper exports dropped from a value of $87,062 in November, 1931, to $43,545 in the same month last year, while wrapping paper shipments decreased in value from $142,921 to $91,761. Exports of uncoated book paper reached a value of $55,749 in November last, against $85,241 in November, 1931, while shipments of tissue and crepe paper scored an appreciable gain from a value of $44,140 in November, 1931, to $73,527 in November last. Toilet paper exports also climbed from a value of $36,119 in November, 1931, to $54,753 in the same month last year. Exports of boxboard, paperboard and strawboard were valued at $26,370 last November, against $134,924 in the preceding November, and other paperboard shipments reached a value of $78,430, contrasted with $72,376. Paper bag exports were valued at $34,744 last November, against $58,018 in the similar month of 1931, while exports of paper boxes and cartons were worth $36,496 last November, compared with $71,285 in the same 1931 month. Sheathing and building paper exports declined from $28,713 in November, 1931, to $10,701 in the same month last year.

CAMACHINE 48-9



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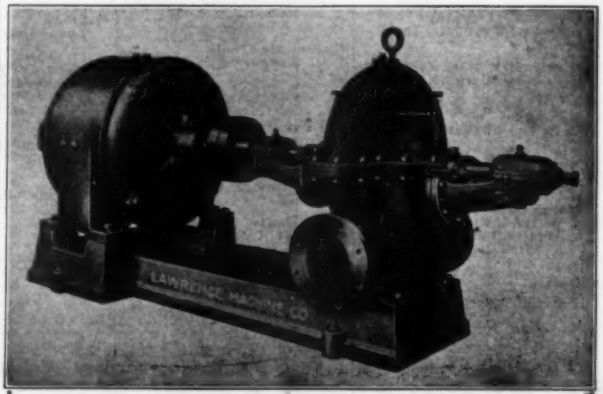

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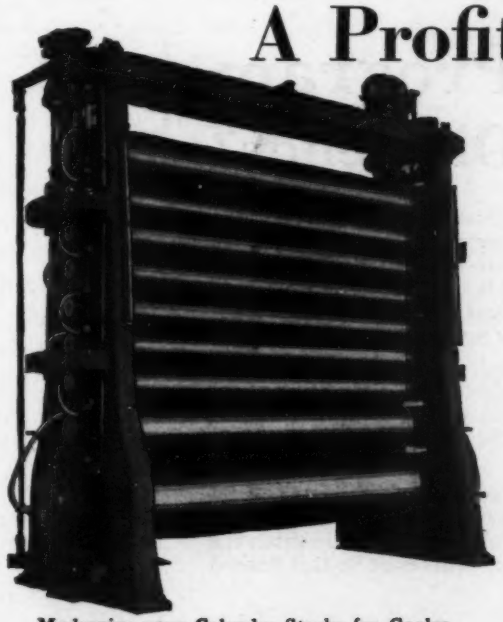

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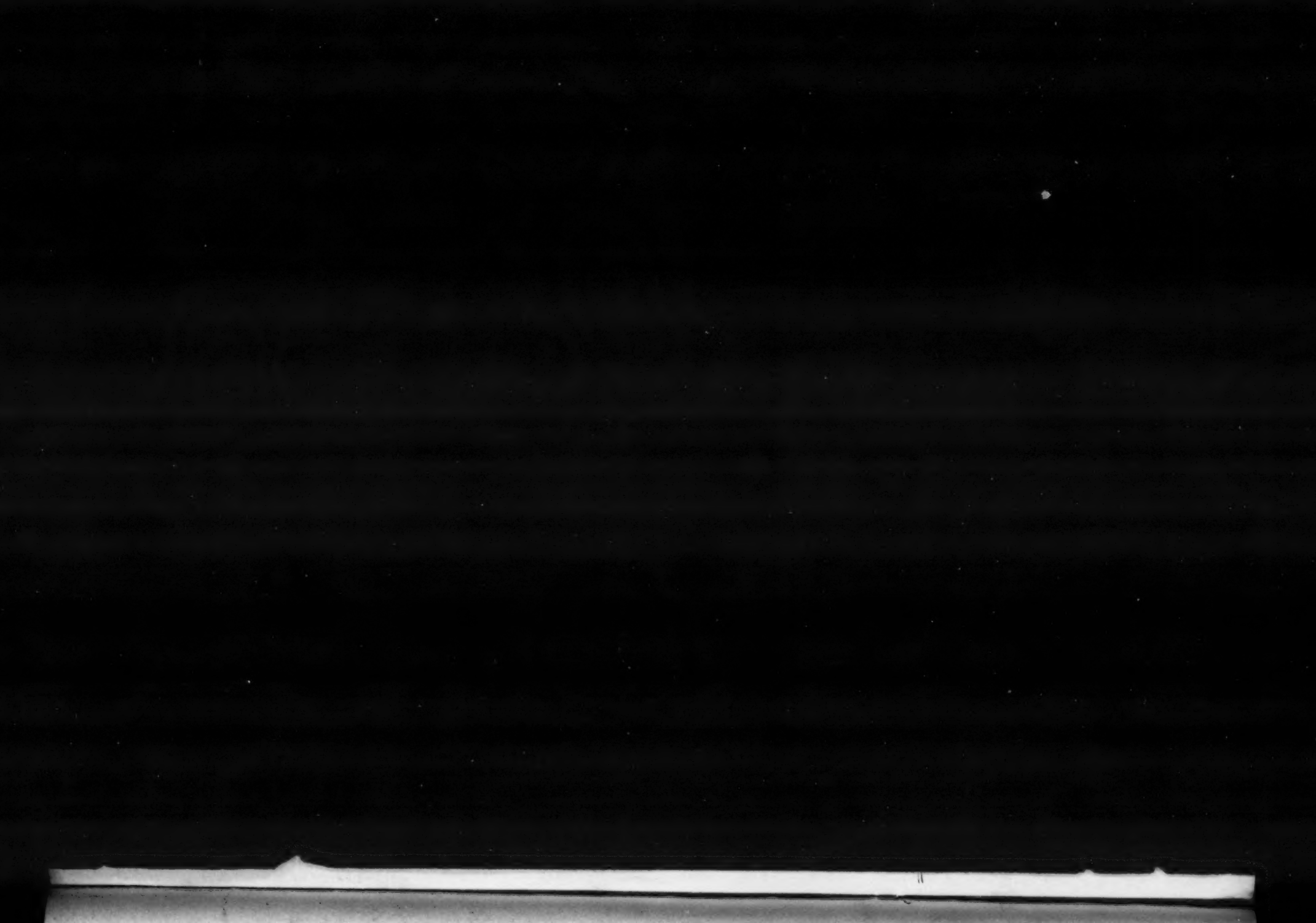
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